

A COMPARATIVE STUDY OF VARIOUS MODALITIES OF TREATMENT OF LIVER ABSCESS

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BONAFIDE CERTIFICATE

This is to certify that this dissertation on “ **A COMPARATIVE STUDY OF VARIOUS MODALITIES OF TREATMENT OF LIVER ABSCESS** ” is a bonafide work done by Dr.N.Muthusamy under my guidance and supervision, appearing for M.S., General surgery branch-I in April 2013.

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DECLARATION

This is consolidated report on “**A COMPARITIVE STUDY OF VARIOUS MODALITIES OF TREATMENT OF LIVER ABSCESS**”, based on cases treated in Government Rajaji Hospital Madurai during the period September 2010 to September 2012. I solemnly declare that this dissertation was done by me under the guidance and supervision.

This is submitted to the Tamilnadu Dr.M.G.R.Medical University, Chennai in fulfilment of the rules and regulations for the M.S., degree examination in General surgery.

Place :

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INTRODUCTION

Liver abscess is an infectious space occupying lesion in the liver. These are the most common type of visceral abscesses, because liver is subjected to numerous viral, bacterial, parasitic infections through portal circulation. Major types of liver abscess are Amoebic liver abscess and pyogenic liver abscess based on etiology.

Amoebic liver abscess is common in tropical and subtropical (1, 2, 4, 17, 19) regions so called Tropical liver abscess. It is caused by *Entamoeba histolytica* infestation. 3-9% of amoebiasis patients may develop amoebic liver abscess. It affects younger individuals when compared to pyogenic liver abscess. The amoebic liver abscess has male preponderance but the pyogenic liver abscess has equal sex incidence.(1,2,4)

Major portions of the reticuloendothelial system in the human body present in the liver. So it can able to handle the continuous low level exposure to enteric bacteria. It is received through portal circulation. Because of high level reticuloendothelial cells in the liver non viral infections are unusual (17).

The liver abscess may be parasitic, bacterial, fungal or tuberculous in origin. Right lobe the liver is commonly affected due large volume and major blood supply. About 90% of the right lobe abscesses are solitary and

about only 10% of the left lobe abscesses are solitary. The abscess may follow the suppurative process anywhere in the body(20).

Pyogenic liver abscess are caused by bacteria. The infective foci arise from (1, 2, 4, 17, 19)

- a) biliary tract
- b) portal circulation
- c) haematogenous via hepatic artery
- d) direct extension from intra abdominal regions
- e) trauma.

Of these biliary pathology is the most common cause.

In amoebic liver abscess the most common symptom is abdominal pain. In pyogenic liver abscess fever is the most frequent symptom. Large abscesses are seen mainly in the amoebic liver abscess.

Ultrasonography is the main modality to diagnose the liver abscess. CT scan abdomen can detect even less than 0.5 cm abscess. Serological tests are confirmatory to diagnose Amoebic liver abscess while pus culture and sensitivity confirms pyogenic etiology.

The main mode of treatment in amoebic liver abscess is medical management. In pyogenic liver abscess the main treatment should be drainage method and antimicrobials.

Liver abscess treated by following methods :

1. Drugs alone
2. USG Guided needle aspiration with drugs
3. Percutaneous catheter drainage
4. Laparoscopic drainage
5. Open surgical drainage.

In this study 54 randomly selected cases are taken up and mainly focused on the age distribution, sex ratio, type of the liver abscess, site of the liver abscess, symptoms, signs, size of the abscess, number of the abscess.

In this study the patients with abscess size more than 5 cm are treated with needle aspiration, percutaneous drainage, laparoscopic drainage methods. These patients are studied under following criteria

- 50% reduction of the abscess cavity
- Duration of hospital stay
- Secondary procedure done
- Complications
- Recovery rate are compared.

REVIEW OF LITERATURE

ANATOMY OF THE LIVER: (3)

Among the abdominal viscera liver is the largest. It is occupying the right hypochondrium and the epigastric region. The liver involved in the metabolic activities which are involved in homeostasis, nutrition and immune mechanism. It removes toxic materials in the body and regulates blood glucose levels and lipid metabolism. The liver stores vitamins, iron and micronutrients.

It has superior, anterior, right, posterior and inferior surfaces. Grossly it is divided in to four lobes as right, left, quadrate, caudate lobes. Recently the liver functionally divided in to eight segments based on couinaud's. The abscess location determines the therapeutic decisions for the method of drainage. Comparing the left lobe right lobe is easier to drain percutaneously. Because the superior mesenteric vein preferentially drains in the right lobe of the liver. So the greater amount of the blood goes to the right lobe leads to abscess formation common in the right lobe.

AMOEBIC LIVER ABSCESS:

HISTORY: (2)

Blood and mucous diarrhoea is present in Sanskrit document dated 3000 B.C. Ball-like abdominal masses associated with hepatic abscess also

has been recorded. Twenty six tropical abscess were described in autopsy series with dysentery. Leish recognised the first amoebae in colonic lesions with dysentery.

Between the year 1849-1919, many species of amoeba found in the human beings were *Entamoeba. gingivalis*, *Entameba coli*, *Iodamoeba butschlii*, *Entamoeba hartmani*. In 1903 Schaudin named the species *Entamoeba histolytica*. The two distinct species identified which are morphologically indistinguishable- *entamoeba histolytica* and *entamoeba dispar*. *Entamoeba dispar* is the only pathogen associated with asymptomatic carrier state.

HOST RESPONSE:

Trophozoites contain ribosomal, lysosomal, cytoplasmic materials and contents from trophozoite surface in subcellular fractions eliciting antibody response has been detected by antigenic determinants. In infected patients the organism is detected in feces, serum, and materials obtained from liver abscess.(2,4)

Production of immunoglobulin G is the complex humoral immune response to amoebic infection. Immunoglobulin M also produced as an immune response. But the immunoglobulin E is not produced. Immune serum and immune globulin against amoebic infection have lytic effect on amoeba.

In human being humoral immunity is active against amoebiasis prior to the invasive disease. Cell mediated immunity is active against the invasive amoebiasis. Following amoebic infection the antigen sensitize the T-lymphocytes and induce its proliferation produce lymphokines and activates the macrophages. Malnutrition and alcohol intake predispose the development of invasive amoebiasis. It is seen predominantly in male population.

HOST FACTORS

Human beings are the major reservoir host. Transmission occurs interpersonally through flies and fecal contamination of water. The pathogen *Entamoeba dispar* is common in those who are Homosexuals. But the *E. dispar* is most common in female population, those who are menstruating are not prone for infection but the reason is not known. Because of low iron and presence of protective IgA in the immature milk of lactating women the breast fed children are less commonly affected. The country liquor as it contains more iron it causes invasive amoebiasis frequently. Poor socio economic status and adults of young age group are commonly affected than elder individuals. The protective activity against liver abscess of menstruation is lost during pregnancy. (2)

INCIDENCE

Amoebiasis occurs globally but the incidence is highest at the tropical and subtropical areas. Sometimes those who are serologically positive for amoebiasis and stool culture shows positive result may not show clinical symptoms. Such asymptomatic patients are now thought to be due to *Entamoeba dispar*(2). About 3 to 9 percent of patients with intestinal amoebiasis are prone to develop amoebic liver abscess. Amoebic liver abscess due to heavy alcohol consumption in males, hormonal influence in women before menstruation and iron deficiency anemia protect from abscess in menstruating women.

EPIDEMIOLOGY

There is association of amoebic infection with poor sanitation, hot climate, lack of hygiene and overcrowded living conditions in lower socioeconomic groups of developing countries (1,2,4,17,19). It commonly affect males of age group 30 to 50 years. The reason behind this is due to alcohol induced hepatocellular damage produces nidus for seeding of infection from intestine through portal venous system. Hormonal effects also play a role in causation of liver abscess.

The infection transmitted mainly through fecal-oral route following contamination of food by flies, handling of the food after contamination if there is unhygienic practices are followed in the family (4). If human

faeces are used as fertilizer it may contaminate the water and raw sewage and if the unclean water is used for freshening the food. A mode of spread which was unusual is in paramedical practice of colonic irrigation.

Amoebic liver abscess in developed countries occurs in travellers by *E. Histolytica* after stay of more than one month duration in endemic regions. Immuno compromised state due to HIV infection also increase the chance of amoebic liver abscess. Diseases where the cell mediated immunity is reduced also increase the disease occurrence. As the common organism involved in homosexual amoebiasis is *Entamoeba dispar* in temperate climates the presentation is rarely invasive amoebiasis.(2)

RISK FACTORS

- Alcoholism (1,2)
- Malnutrition
- Immunocompromised states(1)
- Old age
- Malignancy
- Pregnancy
- Recent travel to tropical regions
- Corticosteroid use leads to reduced immunity
- Acquired immune deficiency syndrome

- Homosexual activity

ENTAMOEBA HISTOLYTICA

Entamoeba histolytica (21) is a protozoan of anaerobic in nature. It infects human and primates.

It is a single celled parasite causes intestinal amoebiasis severity range from asymptomatic to discomfort, diarrhoea, dysentery, liver abscess, amoebic encephalitis according to

1. Immunity of the patient
2. State of nutrition of the patient
3. Amount of infective dose
4. Potency of the infective agent

Only in some cases the infection is restricted to the intestinal lumen and non invasive. The non invasive form is having nucleus and number of vesicles in the granular cytoplasm. Although the trophozoites are anaerobic they can survive in the environmental conditions of low oxygen tension. Under certain environments the trophozoites release their vacuoles and around themselves secrete a chitinous wall and forms cysts. Each cyst become quadrinucleate after cell division and mature. These cysts are infective stage of the parasite and the cysts in the feces are viable for several days. The trophozoites are destroyed by stomach gastric juice and

they will not live outside the human host. The factors which stimulate the trophozoites to become invasive are not known. Compared to non invasive trophozoites the invasive trophozoites are larger in size and diameter.

The hallmark investigations for intestinal amoebiasis of invasive form are demonstration of the parasite in the stool, rectal mucosal scrapings, specimens containing trophozoites with ingested red cells. But the cysts and trophozoites present in the stool is not a confirmatory evidence of invasive disease.

The pathogenicity may be increased when the bacterial disease is associated. To understand wide variation in the disease, the most promising advance is the association between the zymodemes and the pathogenicity. An immunofluorescent technique has been reported to distinguish non pathogenic and pathogenic forms. Light or electron microscopy cannot distinguish the non pathogenic and pathogenic forms.

MORPHOLOGY

TROPHOZOITE :

It has a diameter of 15-30 micrometers. The invasive forms are more active and have the diameter of 50 micro meter. It is uninucleate, facultative anaerobe and has a limiting membrane which contains double layer surrounded by a fuzzy with external glycocalyx of 20-30 micrometer in diameter. The strains isolated from patients of 18 in various parts of the

world. Out of these ,seven are pathogenic which are isolated from patients of mucosal ulceration and hepatic abscess. For mobility it has pseudopodes. Trophozoites has ability to multiply but are not infective. But cysts will not multiply. Trophozoites are responsible for amoebic dysentery, hepatitis, encephalitis. It contains fine granular endoplasm with ingested red blood cells and contain one nucleus only.

CYST:

These are infective forms of diameter 8-10 micrometers with retractile wall. They have more than one nucleus. They are Quadrinucleate form, after ingestion they will become metacystic stage another nuclear division occur and forms eight uninucleate trophozoites and complete the life cycle. Cyst can survive in the faecal material lodged under the nail for 45 minutes and can survive for up to one month in the soil at 10°C. Rough chemical and physical environments does not destroy the cysts. Because the cysts are highly resistant to such situations. But they are rapidly destroyed by drying, iodine of 200 ppm, heat of greater than 68°C. They are not killed by chlorination which is used for drinking water purification.

Definitive host is human. No intermediate host or vectors for *Entamoeba histolytica*.

LIFE CYCLE

Infective cysts from infective person are released into water or food. They are ingested by another person. In the stomach they are resistant to low pH. Cysts are excysted by components of bile and bicarbonate in the small intestine. Released trophozoites are carried to the cecum and adherent to the mucosal epithelium of the cecum. Trophozoites multiply by binary fission asexually. Then stops multiplying and encystation occurs. These cysts are released in the faeces. Mixtures of trophozoites and cysts are released in the feces of symptomatic patients (dysentery). But trophozoites are not infectious due to hypo osmotic conditions and low pH destroys the trophozoites.

PATHOPHYSIOLOGY:

Infection begins after ingestion of the quadrinucleate cyst of the *Entamoeba histolytica* following contamination of the food and water with the faecal material. The acidic pH in the stomach does not destroy the cyst and excystation happens in the small intestine in the environment of alkaline and neutral pH followed by release of trophozoite form of the pathogen.

The virulence factors leading the course of the disease process are a parasite protein in the surface Lectin, amoebapores and proteases especially cysteine.

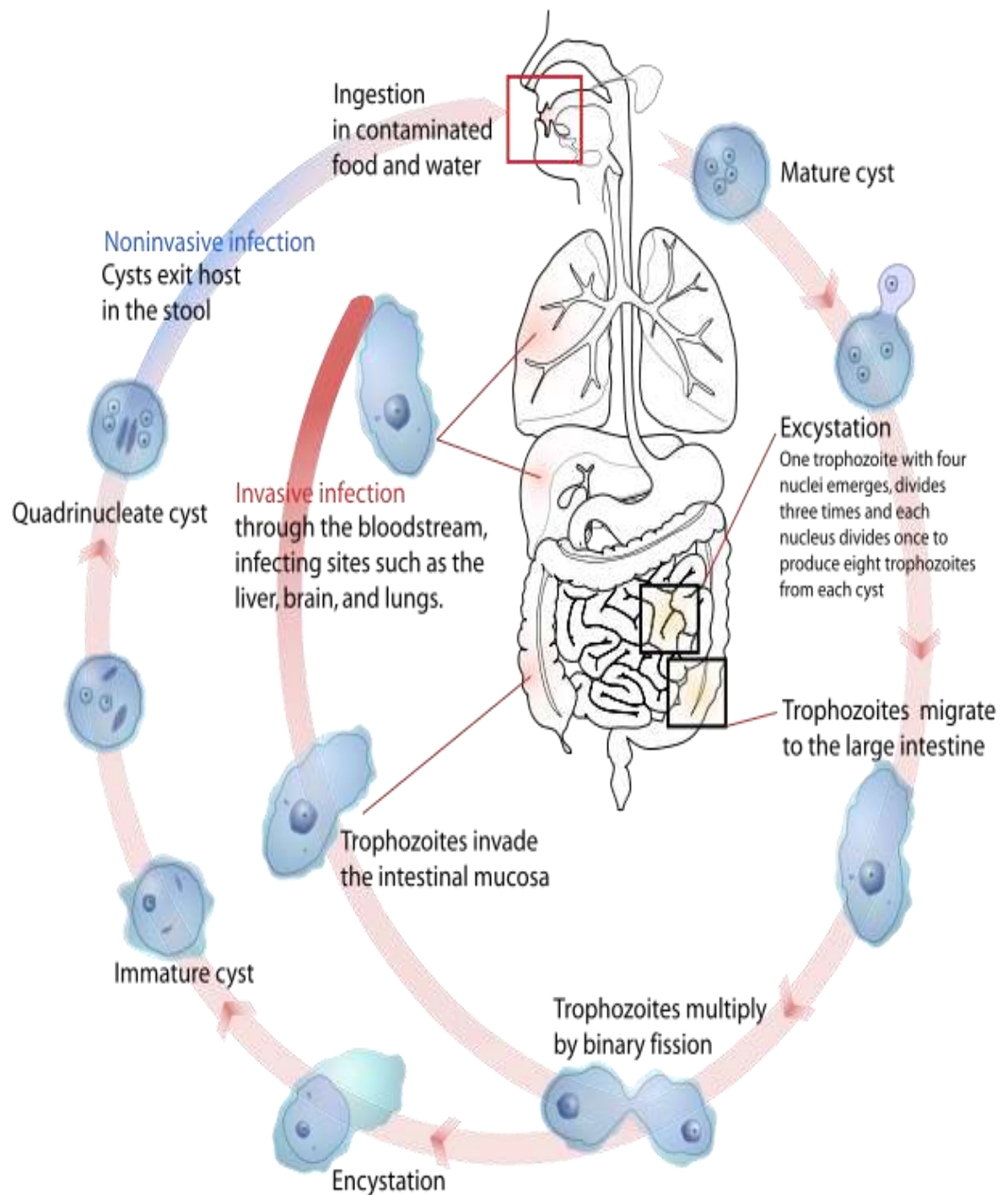


FIG.I. life cycle of *Entamoeba histolytica*

The surface galactose/N-acetylgalactosamine (GalNAc) lectin mediate the adhesion of the trophozoite to the colonic walls. When it attaches to the glycoproteins present in the intestine forming persistent infection. It results in caspase activation, activation of caspase 3 in the apoptotic pathway involved in cell killing and formation of the abscess.

The amoebapores which are small peptides released by trophozoites involved in the breaking up of the lipid bilayer of mucosal epithelium leads to destruction of the barrier function of the mucosa forms the portal of entry to the organism. Its pathogenicity is due to colloid osmotic lysis of the cell.

The cysteine proteases involved in the pathogenesis of extra cellular degradation and cell monolayer disruption. The invasion extends to submucosal layer spreads laterally forming ulcers which are flask shaped. At this stage the differential diagnosis is inflammatory bowel disease. The severity of the infection and the risk of perforation and the abscess formation are increased in the use of corticosteroids.

SITE OF THE ABSCESS AND ITS CONTENTS:

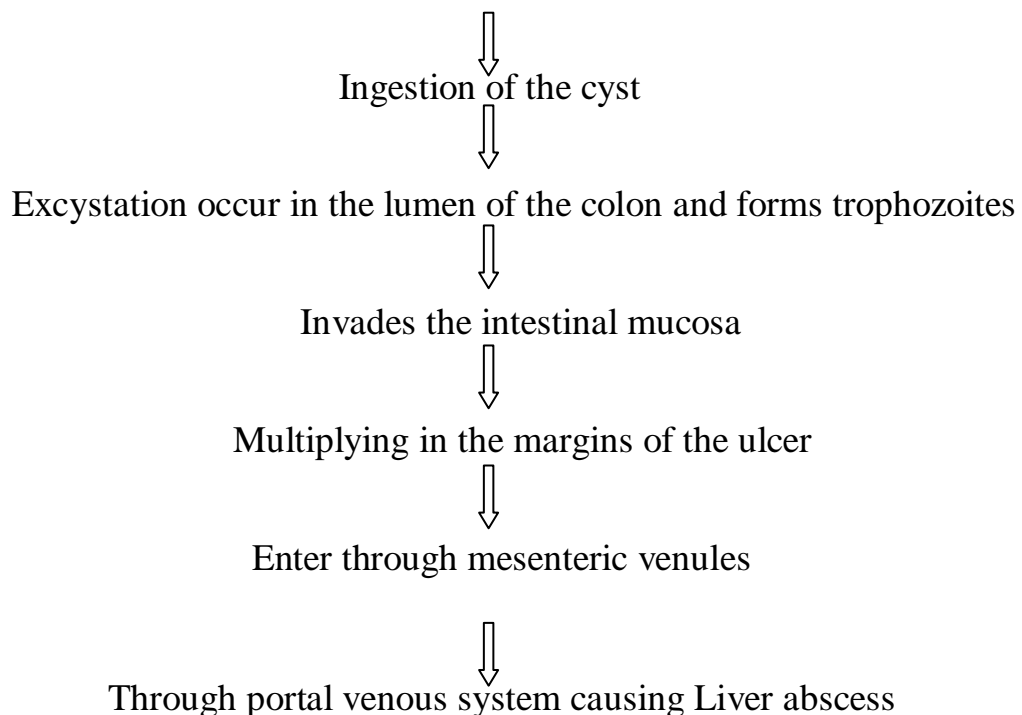
Because of the larger volume and receiving maximum amount of blood supply the right lobe of the liver is commonly involved.(1,2,3,4,17,19,20) It affects the right lobe near the dome of the diaphragm. The amoebic liver abscesses are well defined lesions

containing yellow brown fluid later it becomes orange brown colour anchovy sauce appearance(1,4). The fluid contains necrotic liver tissue and blood. It is odourless contains few or no neutrophils. The edge of the lesion contain necrotic material hepatocytes and inflammatory cells. In the aspirate no amoeba will be found the are mostly present in the periphery of the abscess. There will be periportal lysis of hepatic cells.(1)

Surrounding the abscess the unaffected part of the liver shows hyperaemia and edema which explains the hepatomegaly(4). Infection of the gallbladder and bile ducts does not occur because the bile kills the parasite. Scarring will not occur after healing of the abscess.

PATHOGENICITY:

ENTAMOEBA CYSTS (in water, soil, food under moist conditions)



IMMUNOLOGY AND VACCINE DEVELOPMENT (2)

The immunological reactions for the organism is both humoral and cellular. Some components are in the immunological process limit the disease process and some may exacerbate the disease. Recurrence of the amoebic abscess is rare.

First line of defence against the parasite provided by innate immunity. Eventhough the complement is active against the parasite it cannot prevent the invasion of the E.histolytica because the complement is absent in the gut mucosal secretions. Usually the initial host defence will be due to neutrophils but the parasite kills these cells by producing a chemoattractant on contact.

The adoptive immunity is the second line of defense against E.Histolytica. In this cell mediated immune response cytokines are produced (e.g interferon gamma, tumour necrosis factor alpha, and interleukin 4) these cells activate lymphocytes and macrophages.

The local immune response IgA and serum IgG by Lectin protein causes non invasive and invasive infection of E.Histolytica. Serum IgG response does not provide immunity against the infection. But active against the future invasive disease.

Acquired immunity against the parasite is due to mucosal immune response produced by amoebic antigens inducing the gut associated

lymphoid tissue. These are considered to be primary vaccine candidates. Mucosal immune response are induced by the oral vaccines. The antibody response against the galactose lectin and protection against the amoebic liver abscess also reported. Codon optimized DNA vaccine against the galactose lectin subunit producing cellular immune response and serum antibodies are also reported.

COMMUNITY SCREENING PROCEDURES

The procedures done for parasitologic protocol are (2)

- 1) The unfixed faecal samples which are unstained or stained with iodine examined microscopically
- 2) Ritche's fecal concentration of samples which are fixed with formalin
- 3) Polyvinyl alcohol fixed stools are fixed with trichrome staining
- 4) Robinson's in vitro cultures
- 5) Two stool antigen detecting tests for E.Histolytica and E.dispar.
- 6) Serological tests include enzyme immunoassay, indirect haemagglutination test and indirect immunofluorescence test.
- 7) To identify zymodeme starch gel isoenzyme electrophoresis of the stool samples can be done.

The more sensitive and specific tests among these to distinguish *E.Histolytica* and *E.Dispar* are Robinson's test and zymodeme identification. The most recent test to detect few (<5) cysts in the stool sample is DNA based PCR technique. It is a rapid test to perform and differentiate *E.Histolytica* and *E.dispar* without precultivation. To detect accurately the epidemiology of the two species PCR is the reliable test.

CLINICAL PRESENTATION:

The onset of clinical symptoms are slow and are present for several days or weeks before the patient comes for medical attention. The presentation is insidious onset lasting for two or more weeks.

PAIN:

Right hypochondrial pain is common in liver abscess for one to two weeks. This pain is due to stretching of the liver capsule by the abscess(21).The pain may referred to, right side chest, right shoulder. The pain is dull aching and constant. Pain increases with movements like coughing and deep breathing and walking. Seen in 90-93%(2) of the patients. In the left lobe abscess the pain is present in the epigastric region, precordial or retrosternal, also it may be referred to left shoulder. If the abscess is present in the inferior aspect of the liver it may present as peritonitis of upper abdominal pathology.

FEVER:

Seen in 87-100% of patients(1). It is due to pyrogenic effect of necrosed liver cells. Fever is typically between 38°C to 40°C(2). Mostly seen in all patients.

RIGOR:

Seen in 36-69%(1) of cases associated with fever.

NAUSEA AND VOMITING :

Seen in 32-85% of cases(1)

WEIGHT LOSS:

Seen in 33-64% of cases. If symptoms are more than two weeks patient may present with significant weight loss(1).

DIARRHOEA:

Seen in one third of the patients. Although the stool microscopy is negative in many cases, studies show 75% of the amoebic liver abscess patients are positive (2) for parasites in stool microscopic examination.

OTHER SYMPTOMS

Are anorexia and acute colitis.

PULMONARY :

Seen in 18-26% of the patients.(1) Rupture of the abscess into the pleural cavity causes pleural effusion leads to cough and chest pain. During cough odourless brown coloured substance expectorated similar to anchovy paste. Reason being bronchopleural fistula. It is nothing but acellular proteinaceous debris consisting of necrotic hepatocytes.

SIGNS:

ON GENERAL EXAMINATION:

Most of the patients are ill health with sweating, anaemic and toxic. There will be pain during movements. Some of the patients are asymptomatic or may be only associated with fever.

FEVER: This is the most common sign seen in 99% of cases(1,2).

HEPATOMEGALY:

This is generalised soft hepatomegaly sometimes with tenderness. May be accompanied with overlying muscle guarding and inter costal tenderness, warmth and cutaneous edema. The usual differential diagnosis are acute cholecystitis, hepatitis, pyogenic liver abscess. In the situation of atypical presentation it may be confused with simple cyst of the liver, hydatid cyst, hepatocellular carcinoma.

Point tenderness seen below the ribs and in the intercostals spaces.

ABDOMINAL TENDERNESS:

It is in the right upper abdominal quadrant .Seen in 55-75% of the cases(1). In case of abscess in the left lobe pain will be present in about 28% of the patients.

On percussion there is dullness over the right hypochondrium and can detect the vertical dimension of the liver and pleural effusion and to rule out elevated hemi diaphragm.

DULLNESS AND RALES in the right lung base , breath sounds are decreased in the right lung base. Pleural rub may be present. In case of abscess in the left lobe of the liver there may be pericardial rub.

JAUNDICE:

It is rare. If it is present it indicates the disease is severe. In case of large abscess and multiple abscesses and abscess in the inferior aspect of the liver they may compress the common bile duct causes deeper jaundice. Seen in 5% to 8% of the cases(2).

COMPLICATIONS:

Communication of the abscess occur in the adjacent structures like peritoneal cavity, viscera, large vessels, the pleura, bronchi, lungs and the pericardium.

PERITONITIS:

Peritonitis associated with amoebiasis may be due to rupture of the abscess or due to perforation or necrotizing amoebic colitis. The area of contamination is confined to the adherence of the liver abscess to the anterior abdominal wall, diaphragm, omentum and bowel. Rupture into hollow viscus such as stomach and colon may occur in this situation. Sudden bloody diarrhoea develops following rupture into the colon. Haematemesis seen in situations like rupture into stomach. Rupture into the peritoneal cavity causes peritonitis present as guarding and rigidity and absent bowel sounds.

THORACIC COMPLICATIONS AND PLEUROPULMONARY INVOLVEMENT

Rupture of the abscess into the pleural cavity and the bronchial tree causes pleural effusion. Clinical presentation will be dry cough and dyspnoea which increase the right hypochondrial pain. This rupture of the abscess into the pleural cavity occurs suddenly and rapidly causes collapse of the right lung and fill the right pleural space.

Rupture of the abscess into the bronchial tree causes sudden cough with expectoration containing copious amount of chocolate coloured sputum. Although it is a complication of the liver abscess it has the beneficial effect due to the abscess drained itself.

PERICARDIAL INVOLVEMENT

The left lobe liver abscess is more prone to rupture into the pericardial cavity causes asymptomatic pericardial effusion to cardiac tamponade

THROMBOSIS:

Inferior venacava and hepatic vein thrombosis can occur..

METASTATIC LESIONS IN OTHER ORGANS

PULMONARY AMOEBIASIS :

Amoebic abscess of the lungs divided into Primary and Secondary.

Primary lung abscess is rare and it is due to infection from intestine through portal vein into pulmonary capillaries. It causes lung abscess independent on liver abscess. Secondary lung abscess occur from liver by direct extension through diaphragm.

CEREBRAL AMOEBIASIS :

It presents as a complication of liver or lung abscess. It affects one of the hemispheres.

CUTANEOUS AMOEBIASIS:

Adjoining skin is invaded and causes extensive necrosis and slough will be formed due to the trophozoites of the *Entamoeba histolytica*

SPLENIC ABSCESS:

It is associated with hepatic abscess by direct extension from splenic flexure.

INVESTIGATIONS:

CONVENTIONAL LABORATORY TESTS:

BLOOD HAEMOGLOBIN:

Blood haemoglobin levels are less than 12g/dl most of the blood picture is normocytic normochromic. Even though there is adequate iron storage some times there will be hypochromic blood picture may exist.(1,2)

Usually neutrophilic leukocytosis will be present. The cell count is 10,000-20,000/microlitre. Some times leukemoid reactions can occur in some cases. Eosinophil count will be normal(4).

Erythrocyte sedimentation rate may be elevated.

LIVER FUNCTION TEST SHOWS :

In acute amoebic liver abscess there will be elevated aspartate aminotransaminase (AST) with normal Alkaline phosphatase. In case of chronic amoebic liver abscess increased value of alkaline phosphatase and normal value of aspartate aminotransaminases(4). There is decreased serum albumin level. The bilirubin level may or may not be elevated. If it

is elevated it shows the disease is severe. The most common test to be done in liver function test is elevated prothrombin time. (2)

IMAGING STUDIES :

CHEST X-RAY :

PA view shows elevated right hemi diaphragm seen in 59% of the cases(1). It is usually associated with blunting of the right costophrenic angle due to pleural effusion, atelectasis of the right lower lobe also due to pneumonia.

ABDOMINAL X-RAY:

Thumb printing in the colon. If there is gas in the abscess cavity due to hollow viscus perforation or prior percutaneous intervention can be diagnosed.(2)

ULTRASONOGRAPHY:

Amoebic liver abscess present as solitary sub capsular lesions. These lesions appear in the ultrasound in early stages as hyper echoic lesions than adjacent parenchyma. After the necrosis the abscess core turned into echo lucent with posterior acoustic shadow. The advantages are quick, safe, economical and easily repeatable, with diagnostic accuracy of 90%(2).

The typical findings of hepatic abscess seen in the ultrasound are (4)

- 1) A round or oval shape
- 2) The wall echoes are lack
- 3) Hypo echogenicity compared with normal liver and the diffuse echogenicity of the abscess
- 4) The location is usually periphery and
- 5) The distal sonic enhancement.
- 6) It can detect the location, size, number of the abscess
- 7) Used as a guide for percutaneous aspiration of the abscess.

Sometimes hepatocellular carcinoma and metastatic carcinoma may be confused with the liver abscess because of their hypoechogenicity. It is an ideal tool for the follow up of the patients after management.

CT SCAN : (1,2,4)

CT Scanning can detect smaller lesions in comparing with ultrasound is the major advantage. It is a second line investigation and is reserved for patients when ultrasound is not diagnostic. It is useful in atypical or chronic abscess cases. CT Scanning shows better enhancement of the rim in pyogenic liver abscess and in necrotic liver tumour. In acute liver abscess cases it does not show any better accuracy than ultrasound. It

shows abscess as round hypodense lesions which are well defined and have homogenous structure. It localises the lesion precisely and shows its extent. The disadvantage is more expense and have ionizing radiation.

MAGNETIC RESONANCE IMAGING:

This is not superior to CT Scan in the diagnosis of liver abscess. It is mainly used for the follow up of treated patients and to differentiate the abscess from neoplasm in the liver. In untreated patients on T1 weighted MRI images the abscess cavity appear as hypodense lesions, in T2 weighted images the abscess cavity appear as hyperdense lesions.(2) In the abscess margin there will be incomplete ring of hyperdensity. After treatment the cavity in MRI imaging appear as homogenous complete concentric rings due to fibrosis and hemosiderin deposits in the peri abscess region. After four days of treatment reparative changes will be seen. It indicates the response is good.

Haematoma can be identified by using MRI Scanning. It is a powerful imaging study in detecting, characterizing and monitoring the progress and regression of the focal hepatic lesions. Concentric rings seen in the imaging after successful treatment corresponds to an inflamed granulation tissue is the inner margin, the type 1 collagen represents the next ring, the outer margin corresponds to the atrophic or mildly inflamed liver parenchyma became prominent on T1 and T2 weighted images. The

T2 weighted images shows perifocal edema in the liver and its rapid resolution. Even though these findings are present the pyogenic liver abscess, hematomas and necrotic liver tumours have same features .

LIVER Scan :

Gallium citrate and technetium labelled sulphur colloid radio nucleotide liver scan exhibit 'cold 'spots for amoebic liver abscess and 'warm'spots for pyogenic liver abscess.(2)

Treated lesions persist as cystic appearing lesions become anechoic and calcified. Complete radiological resolution occurs after two years or more. Sensitivity >90% (1)

STOOL EXAMINATION: (1,2,4)

Amoeba in the stool is the confirmatory evidence that the liver abscess is due to amoebiasis. Only 10% to 40% of the patients show positive microscopic stool examination in case of the amoebic liver abscess. It is due to the test may be complicated by the use of laxatives, barium, antibiotics and soap water enema. The most efficient method for obtaining the specimen for examination is biopsy or scrapping from the rectal mucosa during sigmoidoscopy. But the stool examination does not distinguish E.Histolytica from E.Dispar microscopically. In this situation the Enzyme Linked Immunosorbant Assay(ELISA) useful to diagnose E.Hitolytica antigens and can differentiate E.Histolytica and E.Dispar.

Stool Polymerase Chain Reaction. But the stool examination does not prove or exclude the hepatic amoebiasis.

SEROLOGICAL INVESTIGATIONS

The serological tests for amoebic infection are highly sensitive and specific. This test can differentiate the pyogenic and amoebic liver abscess. These tests can also identify circulating amoeba antibodies. The serological tests used are(2,4,21)

1. Indirect haemagglutination test (IHA)
2. Counterimmunoelectrophoresis
3. Complement fixation
4. Immunodiffusion
5. Enzyme linked immunosorbent assay(ELISA)

In all the invasive infection of the amoebiasis and most of the cases of amoebic dysentery are positive for the tests.

The Indirect Haemagglutination test is widely available and highly sensitive. The usual serological titre will be 1:512.

The cheap and sensitive technique widely used to serodiagnosis and sero epidemiological study is the ELISA.

About 90-95% of the patients are positive for anti amoebic antibodies(2) which are detectable after 7 days of infection. If it is positive in endemic

areas carefully the case to be investigated because about 35% of the patients who are uninfected may have detectable antibodies. But the negative serology excludes the disease. In non endemic areas if the test is positive it denotes the disease is confirmed.

DIAGNOSTIC ASPIRATION

It can be done as ultrasound or CT guided needle aspiration. This test is not routinely done.

Therapeutic aspiration is done in following situations: (2)

1. In case of inconclusive, delayed or unavailable amoebic serology and the differential diagnosis is mainly pyogenic liver abscess
2. In case of suspicious secondary infection of the liver abscess
3. A therapeutic trial with anti amoebic drugs is inappropriate as in pregnancy
4. If fever and pain persist for more than 3-5 days even after appropriate therapy may be benefited by aspiration and gives symptomatic relief.
5. If the abscess is extremely large, rupture is to be suspected especially pericardial rupture in left lobe liver abscess.

TREATMENT

Based on epidemiology, clinical features, imaging studies the diagnosis can be made and the empirical therapy can be started before the confirmatory diagnostic test results come.

CONSERVATIVE LINE OF MANAGEMENT: (22)

❖ Tissue amoebicides

- For both intestinal and extra intestinal amoebiasis
 - Nitroimidazoles: Metronidazole, Tinidazole, Secnidazole, Ornidazole, Satranidazole.
 - Alkaloids : Emetine, Dehydroemetine.
- For extraintestinal amoebiasis only
 - Chloroquine

❖ Luminal Amoebicides

- Amide: Diloxanide furoate, Nitazoxanide
- 8-Hydroxyquinolines : Quiniodochlor (iodochlorohydroxyquin, cilioquinol), Diiodohydroxyquin (iodoquinol)
- Antibiotics : Tetracyclines , Paramomycin

Of which the most commonly used amoebicides are Metronidazoles.

METRONIDAZOLE: (1, 2, 4, 17, 19, 22)

It has broad spectrum activity against protozoa. Metronidazole does not affect aerobic bacteria. They are selectively toxic to anaerobic bacteria. After entering into the cell by diffusion its nitro group is reduced and forms redox proteins are effective only in anaerobic microbes to highly reactive nitro radical which exerts cytotoxicity. It will inhibit cell mediated immunity also. It is metabolised mainly in the liver primarily by oxidation and glucuronide conjugation and excreted in the urine.

Adverse effects :

Anorexia, nausea, metallic taste and abdominal cramps are most common. Transient neutropenia. In association with alcohol it can cause disulfiram-like reactions.

Dosage :

For invasive dysentery and Liver abscess – 800 mg tds for 7-10 days. Cure rate for metronidazole is 90%. No drug resistance has reported in *Entamoeba histolytica*. In case of slow response and relapse to metronidazole the course of therapy can be prolonged. Therapeutic aspiration can be combined with prolonged drug therapy.

EMETINE AND DEHYDRO EMETINE:

It is oldest and most powerful drug active against amoebic infection. It can be given through intramuscularly and subcutaneously. This drug is excreted through kidneys. The mechanism of action is inhibiting the protein synthesis. The dose is 1 mg/kg/day for ten days. The most serious adverse effect of this drug is cardiotoxicity.

CHLOROQUINE:

This is an antimalarial drug .4 aminoquinoline. It acts by binding with deoxy ribonucleic acid of the parasite. It has half life of one week mainly it excreted through kidneys. The usual dose is 1g/day for two days followed by 500 mg/day for twenty days.

Luminal amoebicides:

Following invasive amoebiasis treatment to eliminate intraluminal cyst luminal agents should be given. Paramomycin 25 to 30 mg/kg per day orally in three divided doses for seven days. Diiodohydroxyquin 650 mg orally daily three times for twenty days to adults or Diloxanide furoate 500 mg orally for ten days. The luminal agents are advised even if the stool microscopy is negative.

ULTRASOUND GUIDED NEEDLE ASPIRATION: (1,2,4,17)

It is done by using 16G or 18G needle. Widely used for if the abscess size is more than 5 cm. Along with drugs more rapid clinical response seen in the ultrasound guided aspiration of liver abscess if the abscess are larger in size >5 cm without complications. It is a safe modality of treatment used for both diagnostic and therapeutic reasons. It is performed in strict aseptic precautions after sonographically identifying the abscess cavity 16 or 18 G needle is introduced and pus is aspirated . Repeat ultrasound should be done after 24 hours and repeated every three days and assess the size of the abscess , if it is not reducing repeat needle aspiration can be done. It can be repeated up to three times, if not reducing it indicates treatment failure and this group of patients are preferred for treatment under percutaneous catheter drainage or laparoscopic drainage. If the patients are treated by ultrasound guided aspiration the advantages are

- ❖ The recovery rate is increased
- ❖ Accelerate the resolution
- ❖ Complications are prevented
- ❖ Scar will not be present

PERCUTANEOUS CATHETER DRAINAGE (1,2 ,4)

This method is used when the abscess are large in size of > 5 cm. If the ultrasound guided needle aspiration is failed after three attempts percutaneous catheter drainage is preferred. Here the abscess cavity is assessed and 2% lignocaine is injected under sterile precautions needle is inserted and the site of abscess cavity is confirmed by aspirating the pus and a four millimetre incision is made and pigtail catheter is inserted the pus is drained and the catheter is fixed to the skin level. Daily the drain output is monitored. It is removed after the drain is nil. When compared to ultrasound guided needle aspiration this method is better for large abscess of size more than 5 cm.

LAPAROSCOPIC LIVER ABSCESS DRAINAGE 1,2,4,15, 17)

This method is an alternative option for percutaneous catheter drainage. It provides early recovery, minimal surgical site infection. Duration of hospital stay is reduced. It is cosmetically better than open drainage methods. Severely ill patients can also tolerate the laparoscopic drainage methods. The abscess wall is unroofed by electrocautery or harmonic scalpel. In percutaneous drainage method can not keep a large bore drain. Laparoscopically can place a large bore drain it has the advantage to prevent failure of drainage and the resolution of the abscess cavity is faster.

Advantages

- Better localisation of the abscess
- Better access to difficult sites like dome of the liver and the left lobe of the liver.
- Vascular and biliary structure injuries are avoided
- Pleural spillage and pneumothorax can be prevented
- Diagnostic laparoscopy can be done in the same sitting and any intra abdominal pathology can be dealt
- Haemostasis can be more effectively secured
- Route of drainage can be planned
- Secondary infections are reduced when comparing open drainage methods.
- Soft large-bore tube drain for better drainage of residual viscid pus and necrotic debris
- Can place the large bore drains in the abscess cavity accurately.

Disadvantages;

- Due to the absence of tactile sensation breakdown of septations and perihepatic adhesions are difficult.

OPEN SURGICAL DRAINAGE METHOD

This method is preferred in case of

- Rupture into peritoneal cavity causes peritonitis
- Rupture into pleural cavity
- Large abscess cannot be managed with percutaneous drainage methods
- Multiple loculated abscess in the left lobe of the liver
- When the diagnosis is in doubt

PREVENTION: (21)

- **For personal prophylaxis:**
 - Use boiled drinking water
 - Food and drinks should be protected from contamination by flies, cockroaches and rats
 - Raw vegetable use should be avoided
 - Personal hygiene should be maintained.
- **For community prophylaxis:**
 - Effective sanitary disposal of faeces
 - Protection of water supply from faecal contamination
 - Detection and isolation of carriers

PYOGENIC LIVER ABSCESS

HISTORICAL ASPECTS (1,2,4)

Before the advent of the antibiotics the appendicitis was the most common cause of the pyogenic liver abscess. The first documentation is ascribed by Waller, French physician in 1846 that the pyogenic liver abscess is secondary to appendicitis. He referred this condition as Le foie appendiculaire. The first successful treatment for pyogenic liver abscess with the use of antibiotic sulfanilamide with surgical drainage for multiple liver abscess was reported in 1938 by Oschner and colleagues and also they reported that amoebic abscess is three times more common than pyogenic abscess(1). During the year 1947 anaerobic organisms were cultured and treated with penicillin. In the year 1953, McFadzean and colleagues treated pyogenic liver abscess with antibiotics and closed tube drainage method.

EPIDEMIOLOGY: (1,2,4)

It has comparatively higher incidence in neonates those who have umbilical sepsis following umbilical vein catheterization. More than sixty years age group individuals are commonly affected due to biliary pathology leads to spread of infection to liver causes pyogenic liver abscess. Immunocompromised state and trauma predispose liver abscess in adolescents and children. Furthermore, pyogenic liver has no gender, racial and geographic difference.

Previously it was thought to be due to appendicitis causes portal pyemia and liver abscess. But now the trend has been changed common etiology is due to biliary tract disease causing ascending cholangitis and liver abscess. The frequent cause of the liver abscess due to *Streptococcus milleri* and *Escherichia coli*.

ETIOLOGY: (2)

CAUSES OF PYOGENIC LIVER ABSCESS

BILIARY PATHOLOGY:

BENIGN

- Common bile duct stones
- Cholecystitis
- Anastomosis between biliary tract and bowel e.g. chledochooduodenostomy
- Biliary endoscopic procedures like ERCP
- Percutaneous biliary procedures

MALIGNANT:

- Periapillary carcinoma
- Gallbladder carcinoma
- Pancreatic malignancy
- Common bile duct malignancy

PORTAL:

BENIGN:

- Diverticular infection
- Anorectal abscess and other infections
- Pelvic inflammation
- Sepsis in the post operative period
- Perforative peritonitis

- Appendicitis
- Ulcerative colitis and crohn's disease
- Pancreatic abscess

MALIGNANT:

- Colonic malignancy
- Stomach malignancy

ARTERIAL:

- Endocarditis
- Valvular infection
- Ear , throat and nose infection
- Dental sepsis.

TRAUMATIC:

- Blunt and open abdominal injuries
- Chemoembolization
- Percutaneous ethanol injection
- Radiofrequency

CRYPTOGENIC

Rarely: (1,2,4,17,18,19)

- Pre-existing amoebic liver abscess may be secondarily infected.
- Malignancy in the liver due to primary or secondary causes can lead to liver abscess.

- Directly from gallbladder following empyema, perinephric abscess
- From hepatic flexure of the colon infection can spread to the liver forming fistula and liver abscess.
- Blunt injury abdomen due to trauma can cause liver abscess.
- Fungal pathogens and tuberculosis can cause liver abscess.

PATHOPHYSIOLOGY: (1,2,4,17,19)

In extrahepatic biliary obstruction by common bile duct stones, tumours and strictures causes ascending cholangitis which leads to abscess formation in the liver. Cholidocho duodenostomy and choledochojejunostomy can cause liver abscess

Portal pyemia following intra abdominal infection causes liver abscess via portal circulation

Hematogenous infection via hepatic artery following systemic bacterial infection due to bacterial endocarditis, abuse of intra venous drugs and urinary sepsis.

Trauma and laparoscopic cholecystectomy can cause liver necrosis and abscess formation following vascular injury.

Recently cryoablation and trans arterial embolization can also causes liver abscess..

MICROBIOLOGY: (1,2,4,17,19)

The pyogenic abscess is mostly polymicrobial. Enteric facultative anaerobic organisms are commonly involved in the pathogenesis. The potential pathogens are

- Streptococcus milleri or streptococcus anginosus are mainly involved in the causation of the pyogenic liver abscess.
- In case of patients who underwent transarterial embolization for hepatocellular carcinoma leads to liver abscess the pathogen identified are streptococcus aureus, streptococcus pyogenes and other gram positive organisms.
- Liver abscess can occur following candida infection.
- In western countries the liver abscess may be caused by E.coli infection
- Klebsiella pneumonia is isolated from liver abscess of diabetic patients recently in Taiwan.
- In tuberculous liver abscess no organism should be isolated
- In meloidosis liver abscess can occur ,it is due to Burkholderia pseudomallei.

SPECTRUM OF MICRO ORGANISMS CAUSING PYOGENIC LIVER ABSCESS(2)
--

GRAM POSITIVE AEROBES:

- Streptococcus milleri
- Staphylococcus aureus
- Enterococcus

GRAM NEGATIVE AEROBES

- Escherichia coli
- Klebsiella pneumonia
- Proteus
- Pseudomonas aeruginosa
- Enterobacter
- Citrobacter

GRAM NEGATIVE ANAEROBES:

- Bacteroides
- Fusobacterium

GRAM POSITIVE ANAEROBES:

- Clostridium
- Peptostreptococcus

RISK FACTORS: (1)

- Inflammatory bowel disease. In crohn's disease the mucosal barrier is destroyed so it is common in this condition than ulcerative colitis.
- Cirrhotic liver forms a nidus for seeding of infection
- In transplanted liver
- In hepatocellular carcinoma of the liver if hepatic artery embolization is done it may predispose liver abscess.
- Immunocompromised states like diabetes mellitus, HIV infection and leukemia
- Elder age group
- Nutritional deficiency, malignancy, pregnancy, corticosteroid use, chronic alcoholism are the risk factors for liver abscess.

Right lobe of the liver is commonly involved. Because when comparing the left lobe it is larger in size and getting more blood supply.

CLINICAL MANIFESTATIONS: (1,2,4,17,19)

- Fever and abdominal pain are the common symptoms seen in the pyogenic liver abscess. Abdominal pain mainly in the right upper outer quadrant. In case of left lobe liver abscess pain may be present in the epigastric region.

- Chills
- Weight loss
- Nausea and vomiting
- Malaise
- Cough
- Referred pain to the right shoulder
- Pyrexia of unknown origin
- Loose stools
- Palpable liver with tenderness
- Reduced breath sounds in the right lung base, pleural rub may be present.
- Jaundice may be present in 25% of cases due to pre-existing biliary disease, large or multiple abscesses compressing the common bile duct.

INVESTIGATIONS:

BLOOD INVESTIGATION: (1,2,4)

White blood cell count may be increased.

Because of the chronic pathology anemia may supervene. So the blood haemoglobin level will be low.

Decreased serum albumin level. Elevated transaminase level may be seen. Diabetes mellitus may be associated with pyogenic liver abscess. So the blood sugar level should be monitored.

PLAIN X-RAY ABDOMEN AND CHEST:

It may show air or air fluid levels within the abscess cavity if the abscess is due to gas forming organisms.(2,4)

ULTRASOUND ABDOMEN :

Initially the abscess cavity is hyper echoic. It appears as round ovoid elliptic lesions within the liver parenchyma. There will be irregular and echo poor margins.(4) The abscesses are mostly hypo echoic and contain internal echoes of variable in number. If the abscess is due to gas forming organisms the abscess cavity appear as hyper echoic lesions. Ultrasound not only diagnose the abscess also detect other intra abdominal pathology. Sensitivity range from 83-95%(¹)

Liver abscess may present as single or multiple abscesses. A single abscess is cryptogenic. In case of biliary pathology the abscess will be multiple. In pyogenic liver abscess, if the abscess is less than 2cm in diameter described as microabscesses .(2) There will be two patterns of microabscesses one is diffuse military pattern which is seen in abscess of staphylococcal origin. The other pattern is cluster pattern which is associated with coliform and enteric organisms. In cholangitic abscess

secondary to biliary obstruction clustered abscesses occur and are multifocal in nature.

SCINTIGRAPHY:

With technetium sulfur colloid has sensitive to detect lesions more than 2cm in diameter, but smaller lesion may be missed. The advantage is the pyogenic liver abscess avidly take up the gallium.(2)

COMPUTED TOMOGRAPHY:

It has the advantage of able to detect the intra hepatic lesions of size even if less than 0.5 cm and also in the entire abdomen. The pyogenic abscesses are classified according to their size into microabscess (<2cm) and macro abscesses (>2cm). Micro abscesses appear as small low density lesions. Around a large abscess small daughter abscesses clustered to form multiple liver abscess. This cluster sign is suggestive of bacterial etiology. (1,2,4).

CHOLANGIOGRAPHY: (1)

To evaluate the patient with liver abscess both endoscopic cholangiopancreatography and percutaneous cholangiopancreatography are useful. It can identify the anatomy and biliary pathology to rule out ascending cholangitis. It also used to decompress the biliary system to relieve obstruction and ascending cholangitis

MANAGEMENT

Abscess material should be obtained and gram staining to be done and the treatment should not be delayed even without culture and sensitivity. Related to the common organisms the antibiotics to be started. If the abscess is due to biliary pathology it will yield enteric gram negative pathogens. In case of colonic disorders it yield anaerobic pathogens. Recently due to the emergence of many resistant bacteria imipenem, piperacillin tozabactam, ticarcillin clavulonate, ampicillin sulbactam have been recommended. The addition of metronidazole treats bacteroides. This is also used in the treatment of amoebic liver abscess.

Duration and route of administration of the antibiotic therapy individualized to the patient according to number of the abscess, underlying condition, toxicity of the drugs.

DRAINAGE PROCEDURES:

This is the main mode of treatment in pyogenic liver abscess

CLOSED ASPIRATION PERCUTANEOUS CATHETER DRAINAGE

The first closed aspiration was described by McFadzean and colleagues in the year 1953. They treated the pyogenic liver abscess patients with closed needle aspiration and intracavitary antibiotics.(1)

In percutaneous catheter drainage a pigtail catheter introduced into the abscess cavity and the pus is drained under ultrasound guidance.

In patients having Indwelling biliary stents with abscess should be treated with systemic antibiotics and stent change and with or without drainage. In cholangiography if the abscess is communicating with biliary tree stent change only adequate. If no communication with biliary tract ,the tract is small and the patient is septic abscess drainage is mandatory.

SURGICAL DRAINAGE:

Even though the percutaneous and aspiration techniques are developed surgery also plays vital role in the management of liver abscess.

Currently the operations are done through transperitoneal approach and drainage of the abscess and correction of the intra-abdominal disorders. The incision is made in the midline or subcostally. Thorough exploration of the abdomen and correct the intra abdominal disorder and the abscess cavity should be isolated and covered with towels. The pus should be aspirated and sent for culture and sensitivity. After identifying the abscess cavity a tract is made through the liver parenchyma and the abscess should be drained in a dependent fashion. The purulent material should be sucked out. Then the abscess cavity has to be enlarged and the loculated cavities are explored. From the wall of the abscess cavity biopsies are taken to rule out tumour with necrosis and infection and to

examine trophozoites of *E. Histolytica*. a drainage catheter should be kept in the cavity to drain the remaining pus. The catheters are brought out percutaneously through separate stab incision. These drains also used for irrigation, and contrast studies. The omental pedicles are kept in the abscess cavity to improve the blood supply.

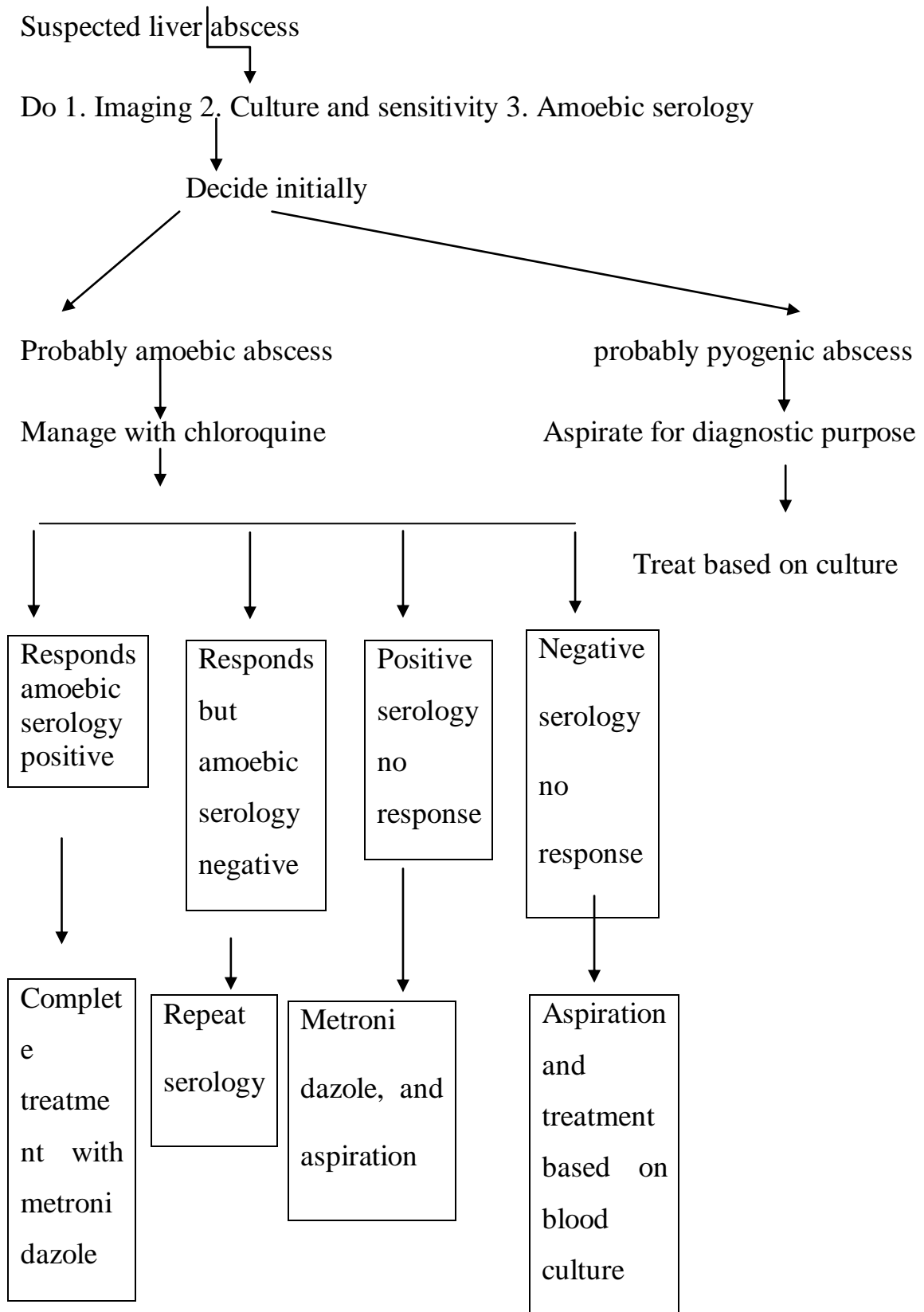
COMPARITION BETWEEN AMOEBIC AND PYOGENIC LIVER

ABSCESS: (4)

CREITERIA	AMOEBIC ABSCESS	PYOGENIC ABSCESS
AGE	30 – 50 years	>60 years
SEX	Males > Females	Equal
EPIDEMIOLOGY	Residence or travel to endemic regions, low socioeconomic status, poor hygiene, homosexuality	May be associated with liver fluke or round worm infection
ETIOLOGY	<i>E. Histolytica</i>	Bacterial etiology
ASSOCIATED CONDITIONS	Rare	Bliliary tract pathology, tumours diverticulitis, intra abdominal pathology
JAUNDICE	Rare	Common
COMPLICATIONS	Rupture into adjacent structures	Rupture, sepsis
LIVER FUNCTION TESTS	Mild derangements. ALP elevated, Albumin reduced	Markedly abnormal: Bilirubin, LDH, AST, Globulin are elevated, Albumin reduced

SEROLOGY	Positive	Negative
BLOOD CULTURE	Negative if not secondarily infected	Positive
RESPONSE TO CHLOROQUINE	Yes	No
RESPONSE TO METRONIDAZOLE	Yes	Sometimes
ABSCCESS CONTENTS	Odourless thick fluid variable in colour	Foul smelling pus, creamy yellow
MEDICAL THERAPY	Always effective	Often effective
MORTALITY	Very low	Appreciable

DIAGNOSTIC AND THERAPEUTIC APPROACH TO LIVER ABSCESS (4)



AIM OF THE STUDY

1. To compare the effectiveness and outcome of various treatment modalities in liver abscess management
2. To study the various clinical presentations and their significance in diagnosing liver abscess
3. To find out how to reduce the hospital stay by choosing treatment options

MATERIALS AND METHODS

54 cases of Liver abscess admitted in government Rajaji hospital , Madurai between September 2010 and September 2012 was taken into the study.

All patients were thoroughly examined and case sheets were written in same set pattern to facilitate later comparison and written consent was obtained from all the patients for our study.

All of them are investigated with ultrasonogram treatment proceeded and pus culture and sensitivity was done and were diagnosed either as pyogenic or amoebic liver abscess.

The following aspects are studied:

1. Age
2. Sex
3. Type Of The Abscess
4. Site Of The Abscess
5. Symptoms
6. Signs
7. Treatment Modalities
8. 50% Reduction Of The Abscess Cavity

9. Duration Of Hospital Stay

10. Secondary Procedure Done

11. Complications

12. Recovery Rate.

54 patients were selected and divided into five groups based on size of the abscess (i.e. Group I, II, III, IV, V)

Group I was treated with Drugs alone

Group II was treated with ultrasound guided needle aspiration along with drugs. Maximum of two times repeated aspiration was done.

Group III was treated with percutaneous catheter drainage (closed tube drainage) along with drugs

Group IV was treated with Laparoscopic drainage along with drugs

Group V was treated with open surgical method along with drugs

Of these groups Group I patients are belongs to the abscess cavity of size less than 5 cm. They are treated with drugs alone.

Group II, Group III, Group IV patients are belongs to the abscess cavity of size more than 5 cm and large abscesses.

Group V patients are belonging to multiple abscesses, ruptured abscess with peritonitis.

ADOPTED THERAPEUTIC PROTOCOL

1. MEDICAL :

All the patients included in the study are treated with drugs and additional drainage procedures except the Group I where they are treated only with drugs. The antibiotics was started empirically without waiting for pus culture and sensitivity reports.

Invariably Metronidazole 500mg intravenously three times daily for three days followed by T.Metronidazole 750 mg three times daily for seven days and antimicrobials like piperacillin tozabactam, amoxicillin clavulonate are given for all the patients without waiting for culture reports. Duration of therapy was ten days. After collecting the reports the appropriate antibiotics were given.

After ten days repeat ultrasound was taken and the abscess size was identified and if the abscess size is not reducing or increasing, drainage procedures are done and the antibiotics were continued.

2. ULTRASSOUND GUIDED NEEDLE ASPIRATION :

This drainage procedure was done for the patients whom abscess size is more than five centimetres. Followed by Inj.Metronidazole and antibiotics.



Fig.2 .Abscess cavity localised by ultrasonogram



Fig .3. Needle aspiration of the abscess cavity

Method:

With the help of radiologists under strict aseptic precaution using ultrasound the abscess cavity was localized and injection xylocaine 2% was infiltrated percutaneously trial aspiration was done and using 16G or 18G needle aspiration of the pus was done. After complete aspiration dressing was applied. The pus was sent for culture and sensitivity. Following aspiration drugs was given for three days. If symptoms and signs are not reducing then repeat ultrasound Abdomen was done and size of the abscess cavity and residual cavity was assessed and if it is increasing in size, second aspiration was done and drug therapy was continued.

The advantage of this procedure is patient does not require general anesthesia. The scar will not be present, infection rate is low.

The acceptability of the patient is poor in this method due to the procedure is painful and distressing, sometimes repeat aspiration may be needed

3.PERCUTANEOUS CATHETER DRAINAGE :

This method is adopted for the patients with abscess cavity of size more than 5 centimetres and large abscesses and for those who are not fit for general anaesthesia and in right lobe liver abscess.



Fig .4. local anesthesia infiltrated



Fig. 5 . stab incision(CLOSED TUBE DRAINAGE



Fig.6. Catheter inserted



Fig .7 . Abscess drained

Method: The abscess cavity is identified either using ultrasonogram or eliciting maximum point of tenderness. After localisation of the abscess, injection xylocaine 2% was infiltrated locally and trial aspiration was done. Then a small stab incision was made, by using artery forceps the abdominal wall was pierced and entered into the abscess cavity. A pigtail catheter or a 24 french malecot's catheter was introduced and all the pus are drained out. The catheter was fixed to the skin using non absorbable suture material and attached to a bag for continuous drainage of the pus.

This method is also does not require general anaesthesia. Major amount of the pus can be drained immediately after placing the catheter in to the abscess cavity. As the closed tube percutaneous drainage method is a crude technique it may cause rupture of the abscess into the peritoneal cavity leads to peritonitis. So care should be taken during the procedure.

After PCD being done

Pus was sent for culture and sensitivity. Empirically Injection Metronidazole and antibiotics were started and Daily drainage output chart was maintained. Daily dressing was applied. Infection of the wound was checked daily and managed.

Removal of PCD in following situations:

- 1) If Quantity less than 10ml/ day
- 2) Not purulent

- 3) No symptoms. Do Ultrasonogram note down the size of the cavity and PCD can be removed

4. LAPAROSCOPIC DRAINAGE METHOD :

This modern technique of liver abscess is used for the abscess size is more than 5 cm, large abscesses. If the percutaneous drainage methods and ultrasound guided aspirations methods are failed and before opening the abdomen for open drainage procedures this method can be tried.

Method:

Under strict aseptic precaution in general anaesthesia a supra umbilical 10 mm port was created and co2 was inflated and pneumoperitoneum was created. Telescope was introduced. Two working ports were created one in the right hypochondrium another one in the midline of size 5 mm. Thorough examination was done intra abdominal pathology ruled out. If any intra abdominal pathology was identified it should be treated along with abscess drainage simultaneously. Trial aspiration was done percutaneously. A wide bore malecot's catheter was kept in the abscess cavity through one of the working ports and the drain brought out to the skin and was fixed with non absorbable suture material. The pus was sent for culture and sensitivity. If the abscess is loculated it cannot be identified by laparoscopic instruments due to poor tactile



Fig 8. Laparoscopic abscess drainage –catheter placed in abscess cavity



Fig9.Theabscess

sensation. After securing complete haemostasis the pneumoperitoneum was deflated and the ports were closed with absorbable suture materials like Vicryl. Post operative antibiotics are given.

After laparoscopic drainage being done monitor:

- The Symptoms
- Quantity of the drainage
- Is it purulent /necrotic liver tissue /serous
- Daily pus collection chart
- Infection of the port site.

Drain was removed after the collection is reduced below 10 ml.

Repeat ultrasound being done after 3 days and the abscess cavity size is monitored.

5. OPEN DRAINAGE METHOD:

This method is used in the following situations:

- Emergency situations like rupture of the abscess into peritoneal cavity
- Multiple abscesses
- Loculated abscesses
- Abscesses with viscous contents obstructing the drainage catheter



Fig 10. Pus culture and sensitivity taken intra operatively(OPEN METHOD

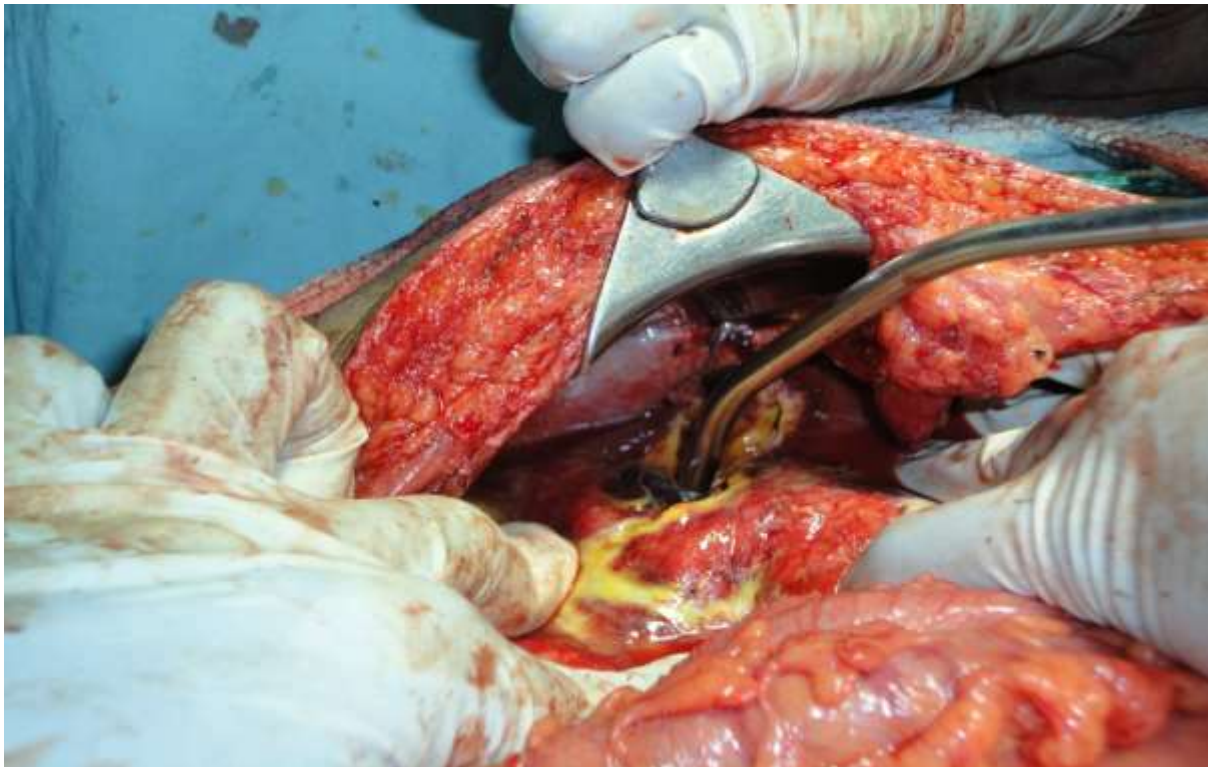


Fig.11 .Open drainage method

- Underlying disease requiring primary surgical management
- Inadequate response to percutaneous drainage within seven days.

Under strict aseptic precaution in general anaesthesia in supine position midline or subcostal incision was made and skin deepened in layers. Thorough laparotomy being done intra abdominal pathology was looked for and managed. The abscess cavity was identified and the peritoneal cavity was covered with towel to prevent the spillage of the pus and catheter was placed in the cavity and brought out to the skin in a separate stab incision. The pus was let out and sent for culture and sensitivity. In case of ruptured abscess thorough peritoneal wash was given and pelvic drain was kept to prevent pelvic abscess. The laparotomy wound was closed with non absorbable suture material. Followed by anti amoebic and antimicrobials given. After the procedure being done following are monitored

- Daily pus collection chart
- Daily dressing to the wound
- Infection of the wound site

The abdominal sutures are removed on tenth postoperative day. Drain was removed after the collection became less than 10 ml/ day .



Fig 12. Multiple liver abscess drainage



Fig 13. Anchovy sauce pus

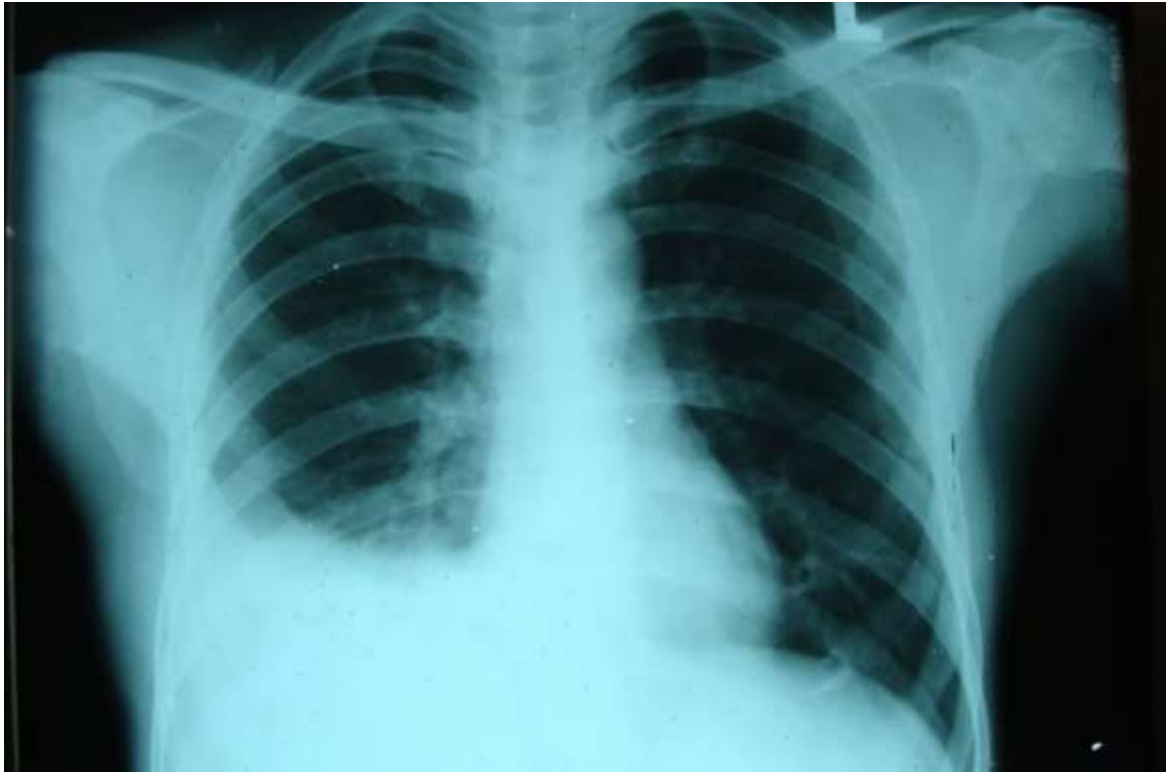


Fig .12. Elevated right hemi diaphragm

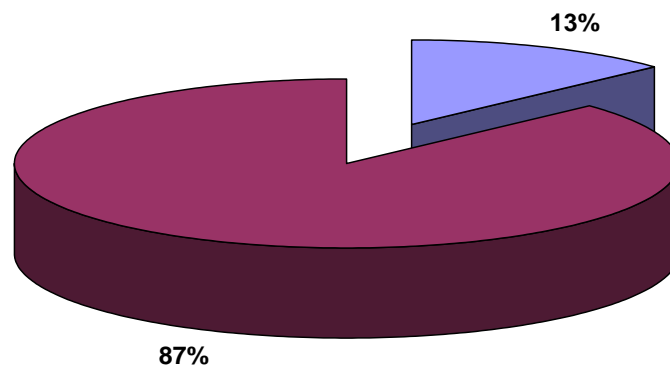
RESULTS

Table – 1

Type of Liver Abscess

Type	No.of cases	Percentage
Pyogenic	7	13.0
Amoebic	47	87.0
Total	54	100
P value	< 0.001 Significant	

TYPE



Pyogenic Amoetic

TABLE – 2

AGE DISTRIBUTION

Age in years	No.of cases	Pyogenic	Amoebic
< 30	6	0	6
31 – 40	26	1	25
41 – 50	11	1	10
51 – 60	7	2	5
> 60	4	3	1
Total	54	7	47
		P = < 0.001 Significant	

AGE DISTRIBUTION

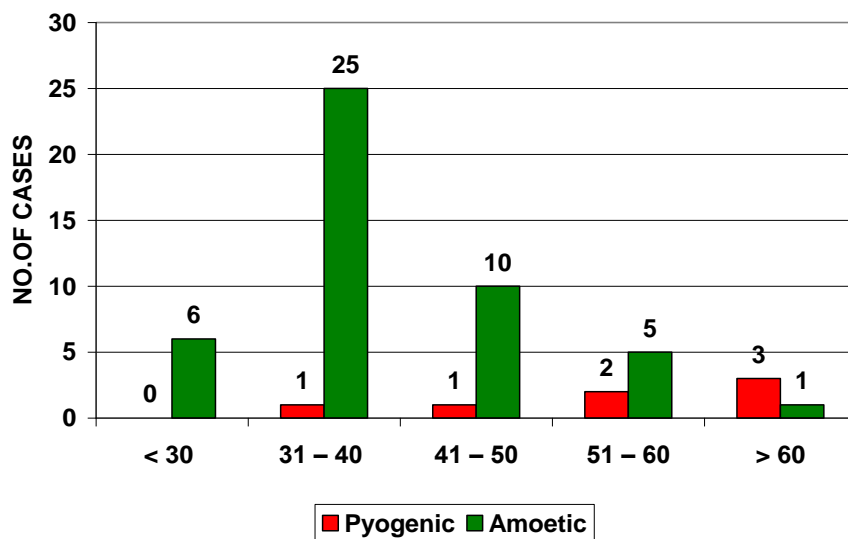


Table – 3

Sex Ratio

	Male	Female	M : F	P value
ALA (47)	42	5	8.4 : 1	<0.001 Significant
PLA (7)	4	3	1.3 : 1	
Total	46	8		

ALA / PLA VS SEX

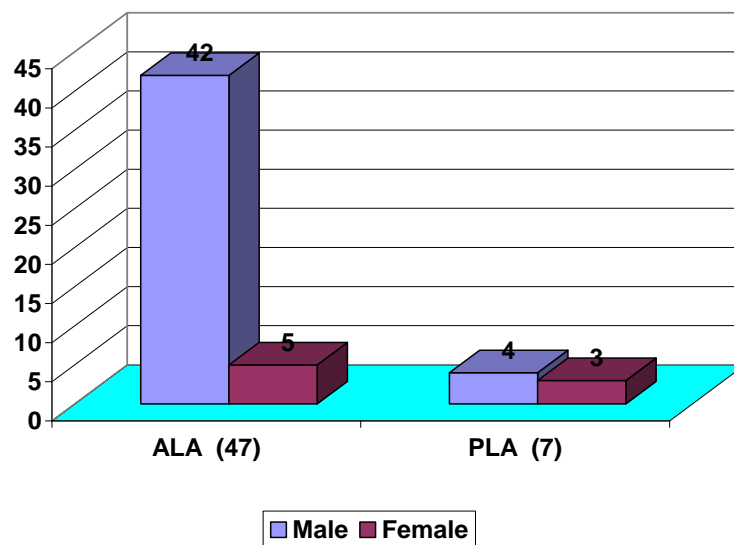


Table – 4

Site of Liver abscess

Site	Pyogenic	Amoebic	Total
Right	5	43	48
Left	1	4	5
Both lobes	1	0	1
P value < 0.001 significant			

SITE OF LIVER ABSCESS

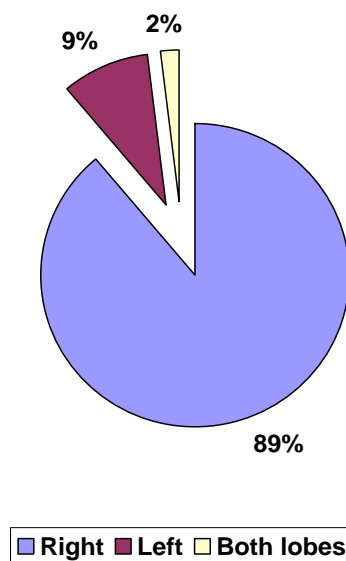


Table – 5

Symptoms

Symptoms	Amoebic (47)	%	Pyogenic (7)	%
Fever	39	82.9	7	100
Abdominal pain	44	93.6	6	85.7
Vomiting	25	53.1	4	57.1
Diarrhoea	12	25.5	2	28.5

SYMPTOMS

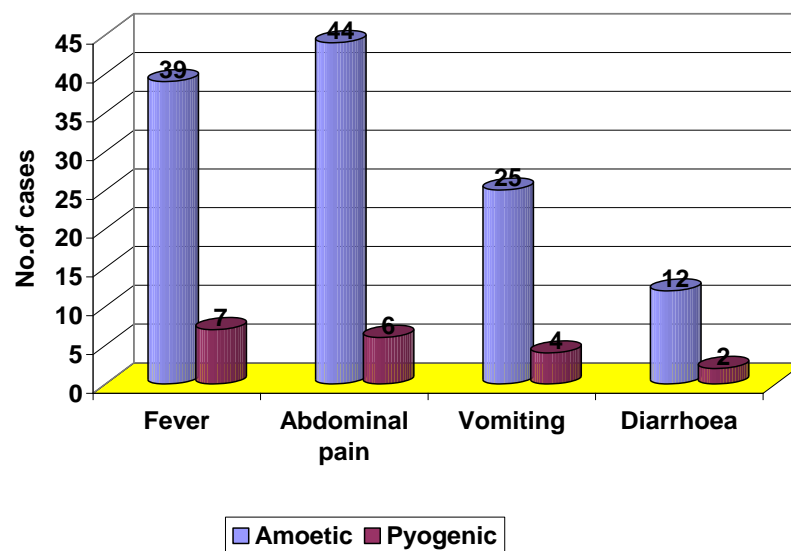


Table – 6

Signs

	Amoebic (47)	%	Pyogenic (7)	%
Tenderness	42	89.3	5	71.4
Jaundice	3	6.3	1	14.3
Hepatomegaly	36	76.5	4	57.1

SIGNS

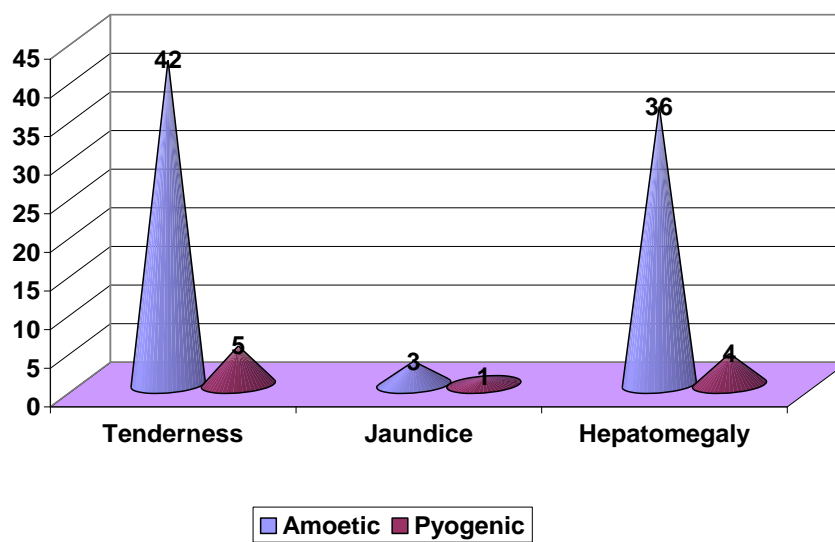


Table – 7

Treatment modalities

Groups	No.of cases
Group I	9
II	14
III	12
IV	16
V	3
Total	54

TREATMENT MODALITIES

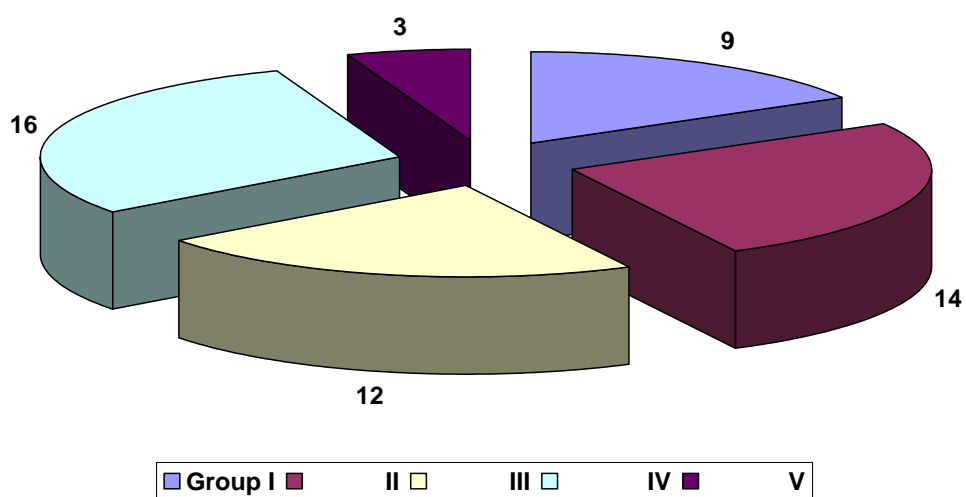


Table – 8

50% Reduction of Abscess Cavity

	Group II	Group III	Group IV	P value
24 hours	0	1	7	0.032 Significant
3 days	0	6	8	0.045 Significant
7 days	8	3	1	
10 – 15 days	6	2	0	0.050 Significant
Total	14	12	16	

50% Reduction of Abscess Cavity

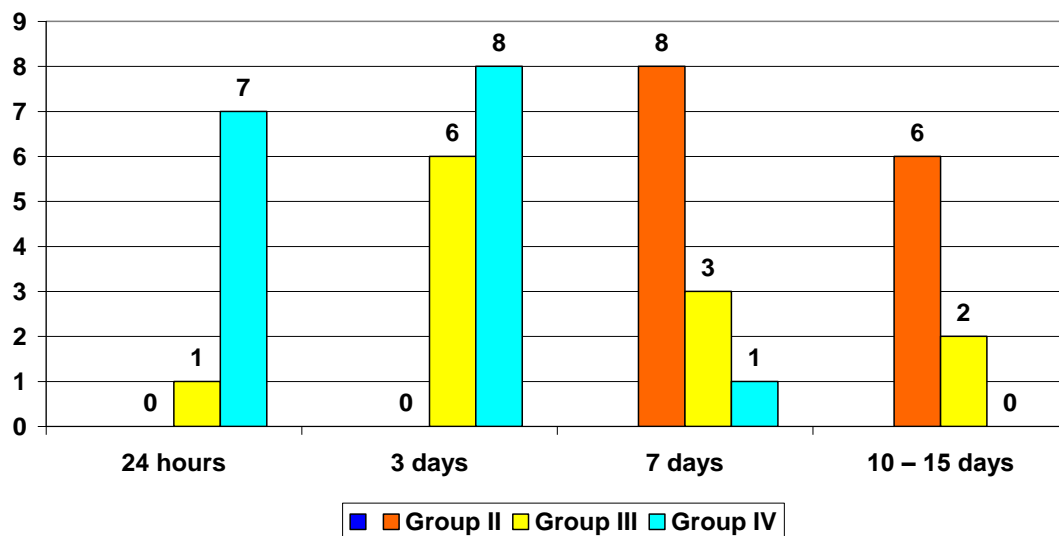


Table – 9

Duration of Hospital stay

	4 days	5 days	7 days	10 days
Group II (14)	2	4	4	4
Group III (12)	2	7	2	1
Group IV (16)	12	4	0	0
P value	0.042			

Duration of Hospital stay

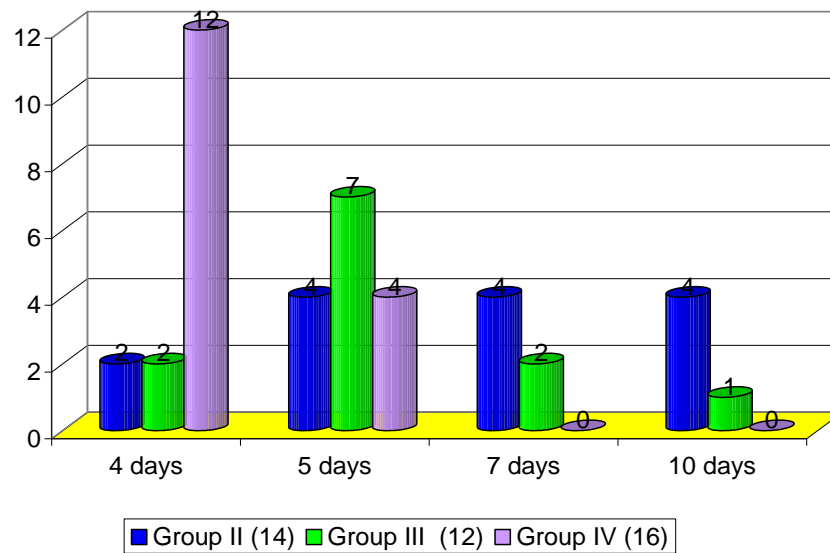


Table – 10

Secondary procedure Done

Procedure	Group II (14)	Group III (12)	Group IV (16)	P value
Yes	8	1	0	0.008 Significant
No				

SECONDARY PROCEDURE

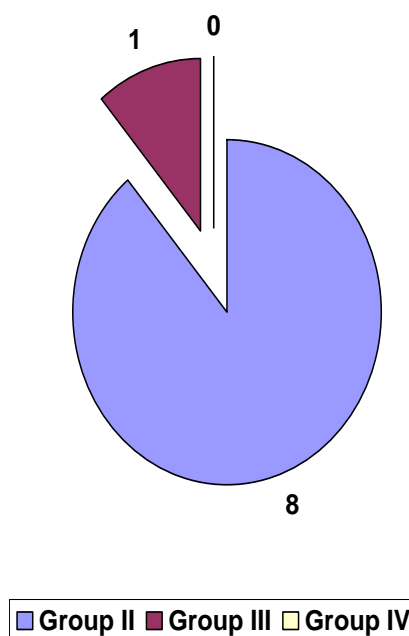


Table – 11

Complications

Complications	Group II (14)	Group III (12)	Group IV (16)	P value
Infection	1	5	0	0.027 Significant
Haemorrhage	1	1	0	
Ruptures	0	1	0	

COMPLICATIONS

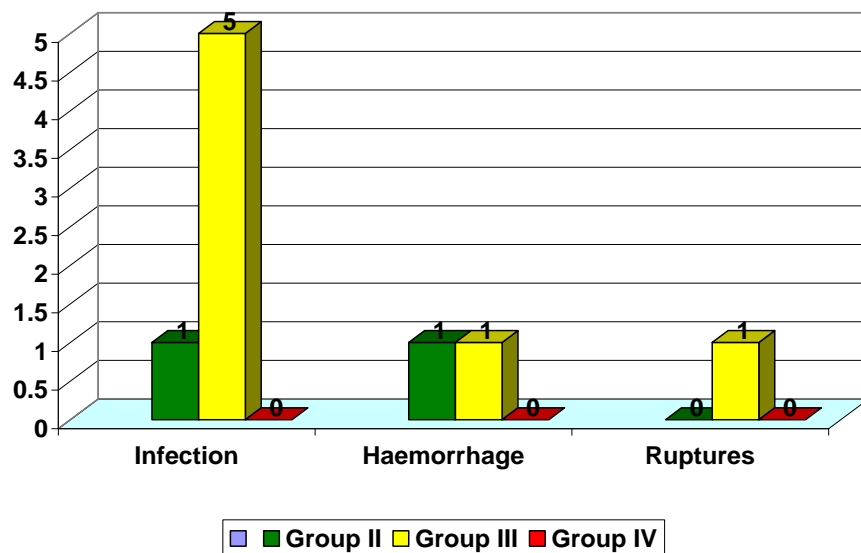
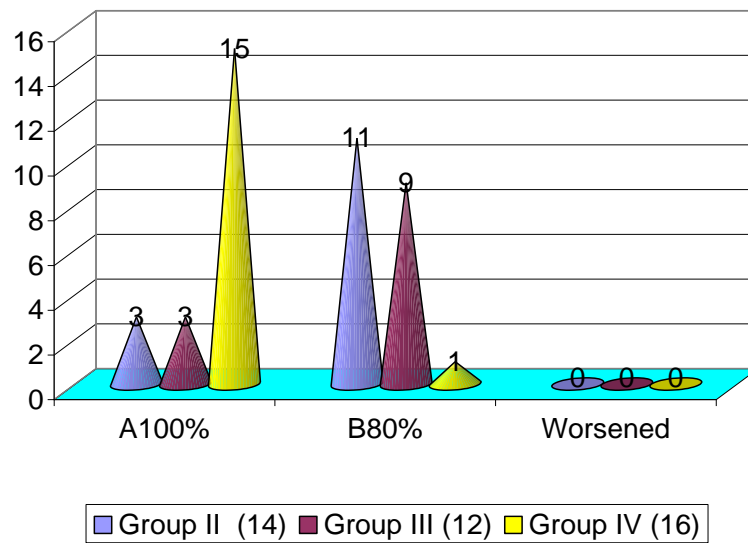


Table – 12

Recovery Rate

Recovery	100%	80%	Worsened
Group II (14)	3	11	0
Group III (12)	3	9	0
Group IV (16)	15	1	0
P value	0.044	0.019	

RECOVERY RATE



ANALYSIS OF THE RESULTS

TYPE OF THE LIVER ABSCESS:

In our study Among 54 patients included of them 87% of the patients (47) are amoebic liver abscess and 13% of the patients (7) are belongs to Pyogenic liver abscess. The P value is significant (< 0.001)

This is correlated with other studies (5, 23)

AGE DISTRIBUTION:

In our study most of the patients of amoebic liver abscess are within age group 30 to 50 years. Most of the pyogenic liver abscess patients are above 60 years of age group

This study correlates with other studies (6)

SEX RATIO:

In our study sex ratio in amoebic liver abscess is about 8.4:1 shows significant P value <0.001. In pyogenic liver abscess the ratio is equal 1.3:1. This study also correlates with other studies. (5, 23)

SITE OF THE LIVER ABSCESS:

In our study about 48 patients the liver abscess was found in the right lobe of the liver, in five patients in the left lobe of the liver and in 1 patient in both lobes of the liver. This study is also correlating with other studies (7, 8)

SYMPTOMS :

In our study Fever is 100% and 82.9% , abdominal pain is 85.7% and 93.6% , vomiting is 57.1% and 53.1% diarrhoea is 28.5% and 25.5% of the patients in pyogenic liver abscess and amoebic liver abscess respectively.

This study correlates with other studies and shows abdominal pain is common in amoebic abscess and fever is common in pyogenic abscess.(5, 8)

SIGNS:

In our study tenderness is 89.3% and 71.4% , jaundice is 6.3% and 14.3% , hepatomegaly is 76.5% and 57.1% in amoebic and pyogenic liver abscess respectively.

This correlates with other studies and shows tenderness is common in amoebic while jaundice and hepatomegaly is common in pyogenic liver abscess.(8)

TREATMENT MODALITIES:

Five modes of treatments are available. In our study about 9 patients are in group I they treated by drugs alone. 14 patients in group II are treated by ultrasound guided needle aspiration with drugs. In group III about 12 patients are treated with percutaneous catheter drainage method.

In group IV about 16 patients are treated with laparoscopic drainage method. In group V 3 patients are treated with open surgical drainage method.

50% REDUCTION OF THE ABSCESS CAVITY:

In our study In group II 50% reduction seen in 8 patients after 7 days and 6 patients it takes up to 10-15 days. In group III one Patient got 50% reduction in 24 hours, in 6 patients it takes 3 days ,in 2 patients it takes around 10-15 days. In group IV in 7 patients it takes within 24 hours ,in 8 patients it takes 3 days and in one patient it takes up to 7 days. It shows the laparoscopic, percutaneous catheter drainage methods are having early 50% reduction of the abscess cavity.

This study correlates with many studies. (9,10,11)

DURATION OF HOSPITAL STAY:

In our study most of the patients (12) treated with laparoscopic method had 4 days hospital stay and most of the patients (7) treated with percutaneous drainage method had 5 days hospital stay. The patients treated with ultrasound guided aspiration had hospital stay varies from 7-10 days. For laparoscopic method the P value (0.042) is significant.

This study correlates with other studies (11,12)

SECONDARY PROCEDURE DONE:

In our study about 8 patients in group II was needed secondary procedure like repeat needle aspiration and in group III one patient had secondary procedure. No patients was undergone secondary procedure in laparoscopic method. It has significant P value (0.008)

This study correlates with other studies. (13)

COMPLICATIONS:

In our study Infection was seen in 5 patients of group III and one patient of group II, haemorrhage was seen in one patient of group I and in one patient of group II , rupture was seen in one patient of group III. No complication has occurred in patients of group IV.

This study correlates with other studies (13)

RECOVERY RATE:

In our study 100% recovery rate is seen in 15 patients of group IV , 3 patients of group II and 3 patients of group III. 80% Recovery rate is seen in patients 11 patients of group II , 9 patients of group III and one patient of group IV. It shows 100 % recovery rate is higher in laparoscopic drainage method.

Most of the studies are correlating with this study.(10, 11,13, 14 ,15, 16)

DISCUSSION

Fifty four cases of liver abscess were randomly selected for the study in the year between September 2010 to September 2012 in Government Rajaji Hospital, Madurai regarding their age, sex, type of the abscess, symptoms, signs, treatment modalities, reduction of the abscess cavity more than 50% in days, duration of hospital stay, secondary procedure required, complications and recovery rate.

TYPE OF THE ABSCESS:

Worldwide the most common type of liver abscess is due to amoebiasis called amoebic liver abscess. In developed western countries the common etiology for liver abscess is due to bacteria called pyogenic liver abscess. Still in India and also in other developing countries amoebic liver abscess is common. Also in temperate climate countries where the sanitation is poor and overcrowded area and unhygienic practices are followed this amoebic liver abscess is commonly present. In developed countries where the sanitation is good there is less chance for amoebic liver abscess. Fungal and tuberculous diseases are also causing liver abscess. But no case was reported in our study.

In comparing with other studies our study also conclude that amoebic liver abscess is common type in India.(5,23)

AGE DISTRIBUTION:

Amoebic abscess is due to the parasite *E.Histolytica* where the infective form cyst is present in the contaminated water causing amoebiasis. It becomes invasive disease when the liver gives area for seeding. In India most of the young individuals are affected between the age group 30 years to fifty years those who are alcoholic and living in overcrowded area with poor sanitation. Alcohol causes hepatocellular damage and make a nidus for infection.

Instead the older individuals more than sixty years of age group are commonly affected by pyogenic liver abscess mainly due to biliary tract disease. In earlier days it was due to appendicitis leads to portal pyemia and liver abscess.

In comparing with other studies(8) regarding age distribution of the liver abscess the amoebic liver abscess common in younger age group and pyogenic abscess common in elder age group. It correlates with our study.

SEX RATIO:

When comparing females most of the males are consuming alcohol. So the alcohol induced liver damage is common in male population leads to the increased incidence of amoebic liver abscess in men in India. The Amoebic liver abscess is seven to ten times more common in men than in

women. But there is equal incidence in both males and females in case of pyogenic liver abscess.

In our study in amoebic liver abscess commonly affecting the males which is approximately eight times more common than females also in pyogenic liver abscess the incidence is more or less equal. It correlates with other studies (5,23)

SITE OF THE LIVER ABSCESS:

Because of large volume and the increased blood flow to the right lobe of the liver the infection seeding occurs most commonly in the right lobe of the liver. Most of the study says that the right lobe is commonly involved , our study (7,8) also correlates.

In our study for all the cases ultrasonogram was done where the abscess was found commonly in the right lobe in most of the cases.

SYMPTOMS:

ABDOMINAL PAIN:

The pain in the right hypochondrial region is due to stretching of the liver capsule by the abscess cavity. If the abscess is large enough to stretch the capsule may cause pain and if it is smaller the pain is uncommon. In case of right lobe liver abscess the pain was referred to right shoulder. In case of left lobe abscess the pain was referred to epigastrium or to the precardiac region.

In our study most of the liver abscess in the right lobe of the liver and most of the patients with pain in the right hypochondrial region. When comparing with other studies our study is correlated.(5,8)

FEVER:

In comparison with amoebic liver abscess, pyogenic liver abscess has slightly higher incidence of fever. In our study all the cases of pyogenic liver abscess are having fever whereas in amoebic liver abscess 82.9% of the patients are found to have fever.

This is also correlating with our studies(5,8)

VOMITING:

In our study nearly half of the patients of pyogenic liver abscess and half of amoebic liver abscess are having nausea and vomiting.

DIARRHOEA:

In our study about one third of the patients are having diarrhoea this correlates with other studies.

SIGNS:

TENDERNESS:

The right hypochondrial tenderness is frequently associated with liver abscess particularly in amoebic liver abscess. Inter costal tenderness

can be elicited in many patients. In our study most of the amoebic liver abscess patients are associated with tenderness.

This result is also correlating with other studies.(8)

JAUNDICE:

This is common in patients with pyogenic liver abscess because the biliary tract disease is the most common etiology. This is due to compression of the common bile duct by multiple abscess or large abscess. Mild jaundice is seen in case of amoebic liver abscess.

HEPATOMEGALY

If the abscess size is larger the liver is palpable clinically. Ultrasound can also identify the hepatomegaly and abscess size. Most of the patients with amoebic liver abscess having hepatomegaly. Sometimes the pyogenic liver abscess show hepatomegaly.

INVESTIGATIONS

Blood haemoglobin, Blood sugar, White blood cell count, Liver function test are done routinely for all the patients included in the study. The percentage of increased alkaline phosphatase, increased bilirubin and decreased albumin levels are seen in patients with amoebic liver abscess. Anemia was seen in half of the patients in the study group. The leukocytosis was observed in three fourth of the patients in both groups.

Chest X-ray PA view was taken to all the patients.

Ultrasound abdomen was done to all the patients to know the size, number, location of the abscess cavity and rupture of the abscess and intra abdominal pathology. CT Scan was not required for any of our patients included in the study.

TREATMENT MODALITIES:

In our study for all the patients ultrasonogram was done. The location, size, site of the abscess cavity was identified. The patients included in the study was divided in to five groups.

The group I patients were treated with drugs alone and they have abscess size of less than five centimetres. The group V patients are treated by open surgical method followed by drugs. These patients are treated in emergency situations. Group II, Group III, Group IV patients are categorized based on the abscess size more than 5 centimetres and large abscess. These three group patients are compared because the three modalities of treatments like ultrasound guided needle aspiration, percutaneous catheter drainage, laparoscopic drainage methods can be applied to all these groups. So in the following aspects these groups are studied

- More than Fifty percent reduction of the abscess cavity in how many days

- Duration of hospital stay
- Secondary procedure done or not
- Complications like: 1.Infection 2. hemorrhage 3. rupture
- Recovery rate

MORE THAN 50% REDUCTION IN THE ABSCESS CAVITY:

In group II for aspiration wide bore needles are used. In some instances pus may be thick so some amount of pus may be retained in the abscess cavity. In this situation for reduction of the abscess cavity may be delayed. This is identified by repeat ultrasound 24 hours, 3 days, 7 days and 10 days after the treatment. In group III and IV patients the abscess cavity is reduced earlier than the group II because there wide bore drains are used.

In percutaneous catheter drainage method and laparoscopic drainage methods large amount of pus can be drained in single aspiration so the reduction of the abscess cavity is higher. As there is continuous drainage of the pus the reduction and resolution of the abscess cavity is faster.

This is correlated to other studies when comparing with our studies.(9,10,11)

DURATION OF HOSPITAL STAY:

In group I the patients are treated with intra venous antibiotics for 3 days in the hospital and discharged and oral antibiotics were given for one week and reviewed with ultrasound followed by decision was made whether further treatment is required or not. In group II patients ultrasound guided aspiration was done followed by drugs are given. Then repeat ultrasonogram was done in 24 hours, 3 days, 7 days and 10 days , followed by further treatment was decided and post procedure hospital stay durations are recorded. The same procedure was done for group III, IV patients and compared. In group V patients postoperative hospital day duration was longer due to the open surgical procedure, general anesthesia, wound infection, need for intravenous antibiotics.

Comparatively in laparoscopic drainage method has the advantage of shorter duration of hospital stay due to early reduction of the abscess cavity and recovery from the symptoms and signs in ultra sound guided aspiration the recovery time and the time taken for reduction of the abscess cavity is longer. Also need for secondary procedure is high in ultrasound guided aspiration. In percutaneous catheter drainage method hospital stay is slightly higher than laparoscopic method due to there may be missed abscess cavities and infection rate is high. This study also correlates with other studies.(11,12)

SECONDARY PROCEDURE DONE:

It is done for patients those who have residual cavity, and the recurrence of the disease. In our study most of the patients in group II were required secondary procedure due to thick pus in the abscess cavity, improper intake of antibiotics, and irregular follow up. One patient in percutaneous catheter drainage one patient was required secondary procedure due to residual cavity. Nil patient in group IV are required secondary procedure.

This also correlates with other studies.(13)

COMPLICATIONS:

INFECTION:

Infection rate is higher in group V patients. Because the open surgical techniques are more prone for infection than any other procedures. Infection may be due to unsterile techniques and contamination of the surgical wound by the pus .In closed tube percutaneous catheter drainage method peritoneal spillage of the pus may occur. In this method also infection rate is relatively higher in comparing group II and group IV patients. Due to the infection the duration of the hospital stay, use antibiotics are increased.

HEMORRHAGE:

This complication is common in case of ultrasound guided aspiration and percutaneous catheter drainage methods due to direct visualisation is not there during the procedures. In laparoscopic and open drainage methods direct visualisation is possible. Hemorrhage can occur in the abdominal wall or the abscess cavity.

RUPTURE:

This is rupture of the abscess in to the peritoneal cavity during insertion of the drainage tube in to the abscess cavity. It may cause peritonitis. All these complications of our study are correlating with other studies(13)

RECOVERY RATE AND RESOLUTION TIME:

It is based on the patient's general condition, associated pathology in the biliary tree, size of the abscess, number of the abscess, treatment opted, postoperative care. If the patient is immune compromised like anaemia diabetes mellitus, patients on steroid therapy, patients on chemotherapy and patients with HIV infection the rate of the healing of the abscess may be delayed. In this situation the co morbid condition and general condition to be improved simultaneously with abscess management.

Associated biliary pathology delays the recovery due to ascending cholangitis, it presents as a nidus for infection. In case of amoebic liver

abscess intestinal amoebiasis should be treated also. If the number of the abscess is more than one and the abscess size large there is a delay in the recovery and prolongs the hospital stay.

Treatment should be planned according to the size of the abscess, general condition the clinical presentation at the time of admission. Correct treatment option can increase the recovery rate markedly. After surgical drainage procedures appropriate antibiotics, adequate nutrition, other post operative care measures to minimise the infection can increase the recovery.

Regular follow up of the patients to be carried out to deal the residual abscess and recurrence of the abscess. By frequent follow up the resolution of the abscess become earlier.

In our study early recovery is seen in the patients whom treated with laparoscopic drainage procedures. This is correlating with other studies.(10,11,13,14,15,16)

SUMMARY

- In the 54 selected cases 47 cases are having amoebic liver abscess and 7 patients are having pyogenic liver abscess.
- Amoebic liver abscess is commonly seen in the age group between 30-50 years and the pyogenic liver abscess commonly seen in the age group more than 60 years.
- In amoebic liver abscess males are commonly affected than the females (8.4 : 1). In pyogenic liver abscess there is equal distribution with slight difference (1.3 : 1)
- All the patients included in the study are belonging to low socioeconomic groups.
- Right lobe abscess in 48 patients, left lobe abscess in 5 patients , both lobes abscess in one patient.
- In amoebic liver abscess 85.7% patients are having abdominal pain. It is higher than pyogenic liver abscess. Fever is seen all the patients of pyogenic liver abscess. In both types half of the patients and one third of the patients having vomiting and diarrhoea.
- Tenderness and hepatomegaly is common in amoebic liver abscess and jaundice is common in pyogenic liver abscess patients.

- < 5cm abscess the treatment is drugs alone .Metronidazole for amoebic abscess and antimicrobials for pyogenic abscess.
- >5cm abscess ultrasound guided aspiration, percutaneous catheter drainage, laparoscopic drainage method .any one can be opted with drugs.
- In case of rupture and multiple abscess open surgical method is ideal.
- In laparoscopic drainage method 50% reduction of the abscess cavity seen in most of the patients with in a day in percutaneous method within 3 days in needle aspiration up to a week some patients require 10-15 days.
- The duration of hospital stay is 4 days in laparoscopic drainage method, 5 days in percutaneous catheter drainage, 7-10 days in needle aspiration method.
- No secondary procedure needed in laparoscopic method. Two third of the patients required secondary procedure in ultrasound guided needle aspiration.
- No complication occurred in laparoscopic method. Infection rate is high in percutaneous catheter drainage and open surgical method.
- 100% recovery rate is higher in patients treated with laparoscopic method. 80% recovery rate is higher in patients treated with percutaneous drainage and needle aspiration method.

CONCLUSION

In case of abscess size is less than 5 cm drugs alone is enough.

If the abscess size is more than 5 cm and large abscess without complications any one of the following method of treatment options may be carried out

1. Ultrasound guided needle aspiration with drugs
2. Percutaneous catheter drainage method drugs
3. Laparoscopic drainage method with drugs

Among these the best option is laparoscopic drainage method.

If the abscess has ruptured with peritonitis open surgical method is best option. In multiple abscesses both laparoscopic method and open surgical methods can be tried.

To minimise the hospital stay laparoscopic drainage method is the best method.

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PROFORMA

NAME:

AGE :

SEX:

OCCUPATION:

IP.NO:

SOCIOECONOMIC STATUS:

HISTORY OF :

- ABDOMINAL PAIN
- FEVER
- NAUSEA & VOMITING
- DIARROHEA
- HEAD ACHE
- MALAISE
- JAUNDICE
- CLAY COLOURED STOOLS

PAST HISTORY OF:

- DIABETES MELLITUS
- HYPERTENSION
- TUBERCULOSIS

PERSONEL HISTORY OF :

- ALCOHOLISM
- SMOKING

FAMILY HISTORY OF :

- ANY SIMILAR ILLNESS IN FAMILY MEMBERS

GENERAL EXAMINATION:

- PALLOR
- JAUNDICE
- PULSE RATE
- BLOOD PRESSURE
- TEMPERATURE

PER ABDOMINAL EXAMINATION:

- GUARDING & RIGIDITY
- RIGHT HYPOCHONDRIAL TENDERNESS
- INTERCOSTAL TENDERNESS
- HEPATOMEGALY

RESPIRATORY SYSTEM :

- REDUCED BREATH SOUNDS IN THE BASE OF THE LUNG FIELDS
- PLEURAL RUB

CARDIOVASCULAR SYSTEM :

- HEART SOUNDS
- PERICARDIAL RUB

INVESTIGATIONS :

BLOOD :

- HAEMOGLOBIN
- SERUM BILIRUBIN
- SERUM ALBUMIN
- SGOT

- SGPT

- ALP

CHEST-X-RAY :

ULTRASONOGRAM:

SITE OF THE ABSCESS:

RIGHT LOBE	LEFT LOBE	BOTH LOBES

SIZE OF THE ABSCESS:

< 5CM	5-10 CM	>10CM

NUMBER OF THE ABSCESS:

SINGLE	MULTIPLE

TREATMENT DONE

DRUGS ALONE (I)	USG GUIDED ASPIRATION WITH DRUGS (II)	PERCUTANEOUS CATHETER DRAINAGE WITH DRUGS (III)	LAPAROSCOPIC ABSCESS DRAINAGE WITH DRUGS (IV)	OPEN DRAINAGE WITH DRUGS (V)

50% REDUCTION OF THE ABSCESS SIZE:

24 HOURS	3 DAYS	7 DAYS	10-15 DAYS

DURATION OF HOSPITAL STAY:

4 DAYS	5 DAYS	7 DAYS	10 DAYS

SECONDARY PROCEDURE DONE

YES	NO

COMPLICATIONS:

INFECTION	HAEMORRHAGE	RUPTURE

RECOVERY RATE:

100%	80%	WORSENER

ABBREVIATIONS

S.NO	–	SERIAL NUMBER
IP.NO	–	INPATIENT NUMBER
M	–	MALE
F	–	FEMALE
A	–	AMOEBIC
P	–	PYOGENIC
R	–	RIGHT
L	–	LEFT
F	-	FEVER
P	–	PAIN
V	–	VOMITING
T	-	TENDERNESS
J	–	JAUNDICE
H	–	HEPATOMEGALY
M	–	MULTIPLE
CM	-	CENTIMETRES
I	–	INFECTION
HG	–	HAEMORRHAGE
RU	–	RUPTURE
W	-	WORSENER

MASTER CHART 2

S.No	NAME	AGE	SEX	IP.NO	GROUP	ABSCESS SIZE REDUCED IN %				HOSPITAL STAY IN DAYS	SECONDARY PROCEDURE	complications			RECOVERY		
						24Hrs	3 DAYS	7 DAYS	10-15DAYS			I	HG	RU	100%	80%	W
1	BABULAL	64	M	69752	G II				50	10	YES	YES				+	-
2	RAMASAMY	30	M	38333	G II			50		5					+		-
3	VEERAMMAL	32	F	22112	G II				50	10	YES					+	-
4	CHELLAMMAL	42	F	44110	G II			50		4					-	+	-
5	RAVI	32	M	52832	G II			50		5						+	-
6	BALAMURUGAN	34	M	28159	G II			50		4					+		-
7	THANGAMMAL	60	F	28117	G II				50	10	YES		YES			+	-
8	VIJAYENDRAN	24	M	31125	G II				50	10	YES					+	-
9	AYYANAR	43	M	28433	G II			50		5					+		-
10	PALANAYAPPAN	36	M	77283	G II			50		7	YES					+	-
11	SHANMUGAPANDI	37	M	52871	G II			50		5						+	-
12	GANESAN	31	M	44432	G II				50	7	YES					+	-
13	VIJAYAKUMAR	28	M	38176	G II			50		7	YES					+	-
14	POTHUMPONNU	32	F	50153	G II				50	7	YES					+	-
15	VINCENT	47	M	42121	G III		50			5		YES			+		-
16	KARUPPIAH	52	M	22134	G III		50			5					+		-
17	RAMAMOORTHY	38	M	66427	G III			50		5		YES			-	+	-
18	NASER AHAMED	31	M	48432	G III		50			5					-	+	-
19	MARIYAMMAL	40	F	63482	G III	50				4					+		-
20	MANIKANDAN	40	M	90912	G III			50		7		YES	YES			+	-
21	CHITTUPILLAI	52	F	33275	G III		50			5					-	+	-
22	JEYACHANDRAN	33	M	11872	G III				50	10	YES	YES		YES		+	-
23	ISAKIMUTHU	48	M	22115	G III		50			5					-	+	-
24	MARIMUTHU	48	M	49278	G III			50		4					-	+	-
25	SETHURAMAN	41	M	33182	G III		50			5					-	+	-
26	SHANMUGAM	40	M	50153	G III				50	7		YES			-	+	-
27	THIRUPATHI	24	M	65282	G IV	50				4					+		-
28	NAGARAJAN	40	M	70829	G IV		50			4					+		-
29	VAIRAMANI	38	M	46757	G IV		50			4					+		-
30	MUTHU	46	M	59224	G IV		50			4					+		-
31	MOHAMED SYED	38	M	36835	G IV	50				4					+		-
32	RAJA	35	M	38281	G IV		50			5					+		-
33	KAMARUDEEN	50	M	43915	G IV		50			4					+		-
34	PITCHAIMANI	60	M	73462	G IV		50			5					+		-
35	VELUSAMY	38	M	87287	G IV	50				4					+		-
36	RAMATHAL	37	F	66423	G IV		50			5					+		-
37	SUBRAMANI	42	M	45465	G IV	50				4					+		-
38	SELVAM	28	M	25442	G IV	50				4					+		-
39	NEELAMEHAM	39	M	39418	G IV	50				4					+		-
40	BOSE	23	M	28465	G IV	50				4					+		-
41	MOORTHY	36	M	72158	G IV			50		5					-	+	-

42	VEERAN	39	M	64328	G IV		50			4					+		-
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